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THE NEW INTERNATIONAL ENCYCLOPÆDIA

SECOND EDITION

VOLUME XII

NEW YORK
DODD, MEAD AND COMPANY
1915

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The University Press, Cambridge, U.S.A.
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KEY TO PRONUNCIATION

For a full explanation of the various sounds indicated, see the KEY TO PRONUNCIATION in Vol. I.

ā as in ale, fate.
ā̇ " " senate, chaotic.
â " " glare, care, and as *e* in there.
ă " " am, at.
ä " " arm, father.
ȧ " " ant, and final *a* in America, armada, etc.
a " " final, regal, pleasant.
a̤ " " all, fall.
ē " " eve.
ē̇ " " elate, evade.
ĕ " " end, pet.
ẽ " " fern, her, and as *i* in sir, etc.
e " " agency, judgment.
ī " " ice, quiet.
ī̇ " " quiescent.
ĭ " " ill, fit.
ō " " old, sober.
ō̇ " " obey, sobriety.
ô " " orb, nor.
ŏ " " odd, forest, not.
o " " atom, carol.
oi " " oil, boil.
o͞o " " food, fool, and as *u* in rude, rule.
ou " " house, mouse.
ū " " use, mule.
ū̇ " " unite.
ŭ " " cut, but.
ụ " " full, put, or as *oo* in foot, book.
û " " urn, burn.
y " " yet, yield.
B " " Spanish Habana, Córdoba, where it is like English *v* but made with the lips alone.

ch as in chair, cheese.
D " " Spanish Almodovar, pulgada, where it is nearly like *th* in English then.
g " " go, get.
G " " German Landtag = *ch* in Ger. ach, etc.
H " *j* in Spanish Jijona, *g* in Spanish gila; like English *h* in hue, but stronger.
hw " *wh* in which.
K " *ch* in German ich, Albrecht = *g* in German Arensberg, Mecklenburg, etc.
n̲ " in sinker, longer.
ng " " sing, long.
N " " French bon, Bourbon, and *m* in the French Étampes; here it indicates nasalizing of the preceding vowel.
sh " " shine, shut.
th " " thrust, thin.
TH " " then, this.
zh " *z* in azure, and *s* in pleasure.

An apostrophe ['] is sometimes used as in tā′b'l (table), kăz″m (chasm), to indicate the elision of a vowel or its reduction to a mere murmur.

For foreign sounds, the nearest English equivalent is generally used. In any case where a special symbol, as G, H, K, N, is used, those unfamiliar with the foreign sound indicated may substitute the English sound ordinarily indicated by the letter. For a full description of all such sounds, see the article on PRONUNCIATION.

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IMAGINARY POINTS AND LINES. In analytic geometry a point is said to be imaginary if one or more of its coördinates are imaginary; e.g., the points of intersection of the straight line $x = 6$ and the circle $x^2 + y^2 = 4$, found by solving the two equations, are $x = 6$, $y = 4\sqrt{-2}$, and $x = 6$, $y = -4\sqrt{-2}$, the two values of y (i.e., the ordinates of the points) being imaginary, the points of intersection of the given line and circle are said to be imaginary. Similarly, the conjugate axis of the hyperbola (q.v.) cuts the hyperbola in two imaginary points. A line whose equation contains imaginary coefficients is called an imaginary line; e.g., the asymptotes of an ellipse or circle are imaginary lines. Their equations may be obtained from the equations of the curves thus: Let $x^2 + y^2 = 0$, then $(x + yi)(x - yi) = 0$, and $x + yi = 0$, $x - yi = 0$ are the imaginary asymptotes to the circle. Similarly,

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 0,$$

then

$$\left(\frac{x}{a} + \frac{y}{b}i\right)\left(\frac{x}{a} - \frac{y}{b}i\right) = 0;$$

and

$$\frac{x}{a} + \frac{y}{b}i = 0, \quad \frac{x}{a} - \frac{y}{b}i = 0,$$

are the imaginary asymptotes to the ellipse. All of these imaginary lines have the real point $x = 0$, $y = 0$. See Continuity.

IMAGINARY QUANTITY. See Complex Number.

IMAGINATION (Lat. *imaginatio*, from *imaginari*, to imagine, from *imago*, image). The conscious representation of objects, relations, attributes, or processes which have not been personally experienced; or the capacity for such representation. Thus defined, imagination is the counterpart of memory, whose function is the representation of previous experience.

The fundamental mental process in both memory and imagination is the idea (q.v.), a complex of images. The power of imagination, therefore, like that of memory, is dependent, first of all, upon the individual's equipment of imagery. An individual born blind never has visual images; one born deaf never hears tunes "ringing in his head." The capacity for various sorts of images, moreover, varies greatly from one individual to another; one person may tend to ideate in visual, another in auditory and kinæsthetic, a third in merely kinæsthetic, images. See Image; Memory.

The distinction of idea of memory and idea of imagination has usually been the popular or logical distinction, based upon meaning or reference. The idea of memory means or refers to some part of one's past experience (one has a memory-idea of one's home or of a piece of familiar music); the idea of imagination has no personal reference (one imagines a centaur, a golden mountain, a novel phrase of music). This reference, if conscious at all, is in the case of memory an associative context, a feeling of familiarity or "at-homeness," or a conscious attitude of placing or dating. In the case of imagination, since the idea is novel, associated ideas are lacking; and the reference is carried by a feeling of unfamiliarity or strangeness, or by a conscious attitude of search or inquiry. (See Meaning; Thought.) The idea of imagination itself seems to be distinguished from the idea of memory as being relatively complete, and as forming simultaneously, whereas the memory-idea is abbreviated and sketchy, and its phases constitute a development in time. This difference may be referred to differences in the interplay of determining and associative tendencies. In remembering, associative tendencies play the leading part; and the resulting formation, provided that it is in any way fitted to mean the experience to be recalled, may be partial or even symbolical. The function of imagination, on the other hand, is to represent a new experience. The idea of imagination must not only mean "something new"; it must be something new, a production rather than a reproduction. This requirement limits the part which association may play, and at the same time is the condition of a strong determining tendency. So the course of ideas in imagination, directed by a stronger and more narrowly defined determination, will be less discursive, more integrative, than that in memory.

The total consciousness in which the idea of imagination is set may show the pattern either of primary or of secondary attention (see Attention), and we may speak accordingly of passive or reproductive and of active or creative imagination. The first is exemplified in the reading of an interesting novel; the second in mechanical or artistic invention or production.

In both cases consciousness is restricted to processes which are directly determined by the context or by the problem to be solved. If, in creative imagination, attention is limited more closely to ideas sharply selected for expressing a single conception or a single mood, this difference is a matter of degree and not of kind.

Consult: Bain, *The Senses and the Intellect* (London, 1888); Sully, *Outlines of Psychology* (New York, 1891); Hoefler, *Psychologie* (Vienna, 1897); Ambrosi, *Psychologia dell' immaginazione* (Rome, 1898); William James, *Principles of Psychology* (2 vols., New York, 1899); Ribot, *Essay on the Creative Imagination* (Chicago, 1906); Lucka, *Die Phantasie* (Vienna, 1908); Titchener, *Text-Book of Psychology* (New York, 1910).

IMA′GO. The adult, sexually mature form of an insect which passes through metamorphoses. See Metamorphosis.

IMAM, ê-mäm′ (Ar. *'imâm*, leader, from *'amma*, to lead, set an example). The appellation given in general to teachers among the Mohammedans, as leaders whose example is to be followed. It is commonly employed to designate any of the persons belonging to the Mohammedan ulema (q.v.), or "learned" body. They are distinguished from the laity by a turban somewhat higher than usual and are held in great reverence by the people. Besides this general use, there are also certain specific applications of the term. Among the Shiites (i.e., the followers of Ali) the term "imam" is applied to the 12 legitimate successors of Ali. Among the orthodox Mohammedans the imam is properly the caliph, or leader of the entire body of Mohammedans; but the name is also extended to any authority whose views on theology and law are followed. In the course of time every Mohammedan community came to have its imam, whose chief function it was to lead the congregation in prayer. He takes his stand in front of the group of worshipers, who take up a position behind him arranged in fixed rows and imitate the genuflections and attitudes assumed by the leader in the course of the prescribed prayers.

IMAMITES, ê-mäm′īts. A Mohammedan sect whose members recognize the 12 imams, descendants of Mohammed's son-in-law Ali, whom they consider the first real imam, or caliph. They are commonly known as Shiites (q.v.).

IMAZIGHEN, ē′mȧ′zē′gäɴ′. The designation of all the Berber tribes of the Atlas Mountains, in Algeria and Morocco, comprising the Kabyles, Shulluhs, and Haratin. The Kabyles, who call themselves Imazighen, are farthest north and more mixed with Semites and Europeans; the Shulluhs (Shluhs) are to be found on the northward-sloping valleys of the Atlas Mountains, while the Haratin Berbers are on the southern slopes and mixed with negroes. (See Kabyles; Shulluhs; Haratin.) They are Hamites fundamentally in blood, but have long been accultured with Arab speech and religion. Their mountain retreats have enabled the Imazighen Berbers to preserve their ancient patriarchal mode of life, so that many hundreds of clans and families keep up their small organizations at the same time that they are united into larger nations. Consult Bertholon and Chantre, *Recherches anthropologiques dans la Berbérie Orientale* (Lyons, 1913).

IMBAT′TLED. See Embattled.

IM′BECILE. See Mental Defectives.

IM′BECIL′ITY (from Lat. *imbecillitas*, weakness, from *imbecillus*, weak). 1. Mental weakness or defect. Imbecility and idiocy are comparative terms. They are both states due to similar processes, consisting of imperfect development of the brain, and due to congenital influences or acquired injury or disease. (See Idiocy.) Thus, it is almost impossible to determine the dividing line that separates an idiot from an imbecile, and such differentiation may entail much study and careful following of the mental development. In general understanding, an idiot is unable to attend to the simple primary affairs of his organization. An imbecile is able to attend to these. At the other end of the scale the imbecile shades into the normal average human mind by imperceptible gradations, and it may be just as difficult to separate the imbecile from feeble-minded, dull, and stupid individuals as it is to separate the idiots from imbeciles. There are large numbers of weak-minded, useless persons in every community who differ from the more robust intellects solely in degree. These are largely imbeciles or feeble-minded. But the more marked and recognizable idiocy is characterized by many of the following signs: the vacant expression, dull senses, small head, deformed body, vacillating and restless gait; pendent, thrown back, or agitated head; escaping saliva, limited and infantile language. The ideas may be few and consist of mere sensuous impressions; the temper, timid, facile, and vain; and the passions are little susceptible of control. The idiot is profoundly defective and largely unteachable. The higher grades may be slightly trained in self-help. The imbecile responds to training and generally may be materially improved, but cannot take an independent place in the world. With close moral support he may ply a simple trade and earn his living.

2. As a generic legal term, a weakness of mind falling short of idiocy (q.v.) on the one hand and full mental capacity to contract or to distinguish between right and wrong on the other. The victim of imbecility, using the word in this sense, is not absolutely incapable of binding himself by contract or of committing crime. If his weakness is taken advantage of by another, any contract or conveyance so secured may be set aside; but the mere fact that a man is of weak understanding, or that his intellectual capacity is below the average of mankind, if no fraud or no undue advantage be taken, is not of itself an adequate ground to set aside a transaction. It should be added that a lower degree of intelligence is required for a valid will than for a business contract or conveyance. In various jurisdictions imbeciles are more or less protected against the fraud of others or their own acts of indiscretion by placing them more or less under the control of others, as in Scotland by interdiction or by the appointment of a committee or guardian. Consult Barr, *Mental Defectives* (Philadelphia, 1904), and Goddard, *Feeble-Mindedness: Its Causes and Consequences* (New York, 1914). See Interdiction; Committee; Guardian; also see Idiocy; Insanity; Lunacy; and the authorities there referred to.

IMBER, ĭm′bẽr, Naphtali Herz (1854–1909). A Hebrew poet and Cabbalist, born of poor parentage at Zloczow in Galicia. He received a thorough training in the Talmud and after the age of 14 led the life of a wandering scholar, visiting in turn Constantinople, Egypt, and Palestine. There he studied the Oriental languages and especially Hebrew. From Palestine he went to England, where he worked for some time in collaboration with Israel Zangwill, whom he taught the Yiddish language. In 1892 he came to America and made his home at different times in New York City, Boston, Chicago, San Francisco, and Los Angeles. In addition to many volumes of poetry and Cabbalistic lore, he wrote extensively for the Hebrew press. In his mastery of the ancient language of the Bible he takes rank with the leading scholars of Europe and America. His poetical works in form and thought are modeled to a great extent upon the songs of Judah ha Levi (q.v.), whose fervent love for and hope in Zion Imber more than echoes. Among his works are: *Austria*, a poem; *The Mystery of the Golden Calf; The Keynote to Mystic Science; The Treasures of Ancient Jerusalem; The Letters of Rabbi Akibah; The Education of the Talmud*, printed by the United States government; *Music of the Psalms*. His "Hope of Zion" has become the hymn of the Zionist party the world over.

IMBERT DE SAINT-AMAND, ăɴ'bâr' de săɴ'tȧ'măɴ', Arthur Léon, Baron (1834–1900). A French author, born in Paris. He was privately educated, studied law, and after being admitted to practice entered the government service in the Department of Foreign Affairs. Here he rose through the several ranks to the grade of Minister Plenipotentiary of the first class in 1882 and was assigned to special service in the central offices of the department in Paris. He is best known as the author of an interesting and popular series of biographical and social studies of the women of the French courts. The first of these, entitled *Les femmes de Versailles* (5 vols., 1875–79), covered the period from Louis XIV to the close of the *ancien régime;* the second, *Les femmes des Tuileries* (37 vols., 1880–99), began with the last days of Marie Antoinette and concluded with the women of the Second Empire. The series has been translated into English under the title of *Women of the French Court*. Among his other published works, some of which have also been translated into English, are: *Portraits de femmes françaises du XVIII et du XIX siècle* (1869); *Les femmes de la cour des derniers Valois* (1872); *Madame de Girardin* (1874); *Portraits de grandes dames* (1875); *La cour de Louis XVIII* (1891); *La cour de Charles X* (1891).

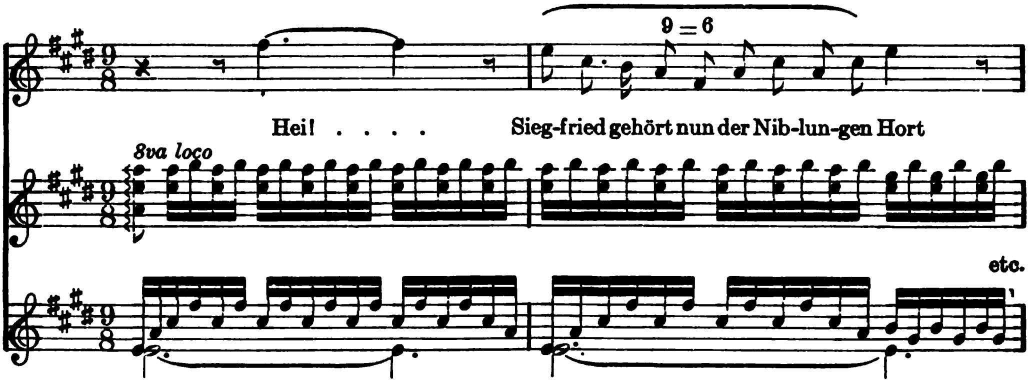
IMBIBITION, ĭm'bĭ-bĭsh'ŭn (from Lat. *imbibere*, to drink in, from *in*, in + *bibere*, for **pibere*, to drink, Skt. *pā*, to drink, OIr. *ibim*, I drink). The physical process of swelling of solids by the absorption of liquid. It is exhibited most freely by organized bodies, i.e., those formed by living beings, which have therefore a characteristic structure, but is not confined to them. The swelling depends on a separation of the structural units of the body, which are believed to be not its molecules but rather molecular complexes. Imbibition, therefore, differs from solution in that the separation of the particles is not so extensive; and when the water is removed by evaporation or otherwise they return to their original relations, so that the body regains its previous form and structure. After solution, on the contrary, the separated molecules may rearrange themselves completely. In a normal condition all parts of plants hold large quantities of water imbibed in their substance. Even in the walls of wood cells, the least watery material, there is usually 50 per cent of water, while in the protoplasm there may be as much as 95 per cent. Indeed, the plant may be considered as a mass of water held between the structural particles of the cells composing it and exceeding in volume the material by which it is so held. This condition alone makes it possible for plants to obtain materials from the water and air about them. See Absorption, in Plants.

The force of imbibition results from the surface of the ultramicroscopical particles, making up the swelling body, adsorbing water or other liquids imbibed. When a dry starch grain imbibes water, heat is developed (on account of the compression of the water) to an amount which indicates (according to Rodewald) a pressure of over 2500 atmospheres. The force exerted by a confined swelling body is at first enormous, but becomes rapidly weaker as the particles are separated farther and farther. Correspondingly water is held loosely when abundant, but more and more tenaciously when only a little is imbibed. Thus, when a bit of laminaria is completely swollen, water can be removed from it by slight pressure; when it holds 170 per cent of water, it requires a pressure of 16 atmospheres to extract water; when only 93 per cent is present, a pressure of 200 atmospheres is needed. Applications of the force of swelling are made in splitting stone by wooden wedges driven in and then wetted, in shortening ropes by wetting, in the use of laminaria for surgical distention, etc. The phenomena of imbibition afford the chief basis for theories concerning the molecular structure of organized bodies. See Colloids; Adsorption.

IMBRIANI, ĕm'brē-ä'nē, Vittorio (1840–86). An Italian poet and critic, born in Naples. He pursued studies in the universities of Naples, Zurich, and Berlin, and took part in the campaigns of 1859 and 1866. In 1884 he was appointed to the chair of æsthetics at the university of his native city, but was then too ill to assume the duties of this post. His political life was a troubled one by reason of his excessively passionate nature, which excited bitter antagonism. He is best known for his collections of popular tales and verse, such as *Canti popolari delle provincie meridionali* (1871–72), *Dodici canti pomiglianesi* (1876), *La novellaja fiorentina* (1877), etc. A number of his poems are to be found in a collection entitled *Eserciej di prosodia* (1874). Among his critical works are some monographs on Dante, and the *Fame usurpate* (1877), in which he seeks to demonstrate that Goethe's *Faust* is a production devoid of all merit.

IM'BRICATED SNOUT BEETLE. A very injurious weevil (*Epicœrus imbricatus*), which damages many different kinds of garden vegetables and fruits, such as onions, radishes, cabbages, beans, watermelons, cucumbers, corn, beets, and strawberries, by sucking the juices of the leaves, stems, roots, or fruit. It also punctures the leaves and twigs of the apple and pear. The life history is not thoroughly known, although the eggs and young larvæ found on the leaves of the strawberry have been described by Chittenden. The best remedy consists in spraying with a Paris green or some other standard mixture.

IMBROGLIO, ĕm-brōl'yō (It., confusion). A musical term denoting the synchronous execution of conflicting rhythms in different groups of instruments or voices; as the following from Wagner's *Siegfried* (Act ii, Scene 2):



The passage must be executed so that the first nine eighth notes of the voice coincide exactly with the first six eighth notes of the orchestra. Voice and instruments come together on the first and third beats of the bar, but not on the second. Another famous example is found in the scene of the Last Supper in *Parsifal* (Act i). Against arpeggios of the strings in 4/4 time the wood wind executes a rhythmic figure in 6/4 time in such a manner that the two groups of instruments come together on the first and third beats, but not on the second and fourth. The most extended and complicated employment of imbroglio occurs in the finale of the second act of *Die Meistersinger*.

IMBROS, ĕm′brŏs. A Turkish island in the Ægean Sea, situated about 13 miles northeast of Lemnos (Map: Greece, E 4). Area, about 87 square miles. It is of volcanic origin, rocky, and mostly barren, but a small part of its area is very fertile. It produces wheat, barley, oats, olives, and fruit. Pop., about 8000, mostly Greeks, engaged in fishing. The chief town is Kastron (Castro), the seat of a Greek bishop.

IMERITIA, ē′mĕ-rĭsh′ĭ-ȧ. Formerly an independent kingdom in Georgia (q.v.), now constituting a part of the Government of Kutais (q.v.) in Russian Transcaucasia. Its history as an independent country begins towards the end of the fifteenth century. In 1621 it first asked Russia for aid and came under her suzerainty in 1650. About 1750 it was occupied by the Turks, who were expelled by the Russians in 1769. In 1810 it was annexed to Russia. The Imers, or Imeritians, who number less than half a million, are one of the tribes belonging to the southern, or Georgian, group of peoples of the Caucasus. They are considered by Pantiukhoff to be the purest representatives of the primitive Georgian type. See GEORGIANS.

IMHOFF, ĕm′hōf, AMALIE VON. See HELVIG.

IMHOFFER, ĕm′hōf-ēr, GUSTAV MELCHIOR (1593–1651). An Austrian Jesuit and South American explorer. He was born near Graz, Styria, and went to Peru as a missionary in 1624. Twelve years afterward he crossed the Andes to the source of the Amazon and was the first European to leave upon record his exploration of that stream to its mouth. His account was published in two volumes in Madrid (1640) and in London (1689), the latter edition called *A Relation of a Journey along the River Amazon*. Father Imhoffer was head of the Jesuit College at Bahía and the author of several treatises upon the language, history, and customs of his adopted country that were published by the Society of Jesus 20 years after his death.

IMHOOF-BLUMER, ĕm′hōf blōō′mēr, FRIEDRICH (1838–). A German numismatist, known as an authority on Greek coins. Born at Winterthur, he became interested in numismatics as a boy, gave up the business career planned for him, received a classical education, and amassed a valuable collection of more than 20,000 ancient Greek coins, bought in 1900 by the Royal Numismatic Cabinet in Berlin. The great work of the Prussian Academy of Science, *Die antiken Münzen Nordgriechenlands* (1899 et seq.), was undertaken at his instance; and in 1901 he gave to the Academy the sum of 100,000 francs for the promotion of the science of numismatics. He wrote: *Zur Münzkunde und Paläographie Böotiens* (1871); *Die Münzen Akarnaniens* (1878); *Porträtköpfe auf römischen Münzen* (2d ed., 1893); *Porträtköpfe auf antiken Münzen hellenischer und hellenisierter Völker* (1885); *Zur Münzkunde Grossgriechenlands* (1886); *Tier- und Pflanzenbilder auf Münzen und Gemmen* (1889), with Keller; *Lydische Stadtmünzen* (1897); *Kleinasiatische Münzen* (1901–13 et seq.), as well as the great illustrated works, *Monnaies grecques* (1883) and *Griechische Münzen* (1890).

IMHOTEP, ĕm-hō′tĕp. An Egyptian divinity, identified with Æsculapius; the son of Ptah and Sekhmet, who with Imhotep formed the triad chiefly honored at Memphis.

IMITATION (Lat. *imitatio*, from *imitari*, to imitate). The repetition of any thought, feeling, or act, or the copying of any example or model. The term is sometimes used in a narrower sense, to denote behavior, the model for which is another person or another like individual.

Imitation, as such, may be conscious to the imitator, as in learning a foreign language; or it may be unconscious, as when an individual in a crowd unknowingly feels and acts like his neighbors. Conscious imitation is to be explained in the same way as voluntary behavior at large. (See ACTION; WILL.) Unconscious imitation—behavior which is imitative, not to the imitator but only to the reflecting onlooker—requires further consideration. There seems to be no sufficient ground for assuming a general instinct of imitation, an inherited tendency to duplicate all impressions either in kind or symbolically. Only certain modes of behavior are imitated; and imitation therefore should be regarded as an expression of specific instinctive tendencies. Similarity of nervous structure in similar beings must mean similarity of behavior in face of given situations; many cases of imitation may be thus understood. Perception of the movements made by an individual in response to a given stimulus may further, it seems, bring about similar movements in a second individual who would otherwise have remained at rest; but the imitative behavior here is apparently a result of attention to the stimulus, of attention attracted in a particular direction by the movement, and not a direct result of the movement itself. Again, when an individual has often been affected and has often reacted in the same way as another, with a simultaneous perception of the movement of that other, an association may be formed such that at a later time the mere perception of movement suffices to touch off a corresponding movement, or arouses a memory of the original situation and is thereupon followed by the appropriate expressive movement. The behavior of a given individual may thus in some cases be the immediate condition of similar behavior in a second individual, though it can serve as adequate incitement only if an instinctive or associative predisposition towards a similar response already exists in the imitator. See IMITATION IN ANIMALS.

In a wide sense imitation denotes the copying of any model whatever and implies merely a certain resemblance between copy and original. In this sense imitation has been used, often without rigorous analysis, as a more or less fundamental concept in a number of arts and sciences. The discussion of imitation in theory of art dates from Plato and Aristotle. In music the term has become technical, indicating the repetition of a phrase or theme in a pitch or key or vocal part different from that of the original, or a repetition with such variation of rhythm or interval as does not destroy resemblance. The importance of imitation in education has been often emphasized. In ethnology imitation has been offered as a key to the understanding of magic and primitive religion. The savage believes that he can bring about desirable conditions by imitating them: thus, he may fling water in the air to bring about rain, or he may try to bring death to an enemy by impaling an image on thorns, or he may worship his god by offering gifts to an idol, the imitation of the god. In certain systems of sociology imitation is regarded as an elementary and fundamental endowment; and custom, fashion, institutions, and the other phenomena of social life are explained in terms of it. These systems, however, fail to take account of the original similarities of activity mentioned earlier in this article; and other systems, which build upon the like responses of like organisms to the same situations, seem not only possible but also more thoroughgoing. For imitation in biology, see MIMICRY.

Consult: Bagehot, *Physics and Politics* (New York, 1873); Bain, *Senses and Intellect* (London, 1888); Preyer, *Mind of the Child* (New York, 1888–93); Grove, *Dictionary of Music and Musicians* (London, 1890); Bosanquet, *History of Æsthetic* (New York, 1892); Giddings, *Principles of Sociology* (London, 1899); Wundt, *Völkerpsychologie* (Leipzig, 1900); Skeat, *Malay Magic* (London, 1900); Tarde, *The Laws of Imitation* (New York, 1903); Baldwin, *Mental Development in the Child and in the Race* (ib., 1906); McDougall, *Social Psychology* (London, 1908); Frazer, *The Golden Bough* (ib., 1911).

IMITATION. In the science of musical composition, the repetition of the same passage, or the following of a passage with a similar one, in one or more of the other parts or voices. It may be either strict or free. When the imitated passage is repeated note for note, and every interval is the same, it is called strict, and it may take place in the unison or octave, or in any other of the degrees of the scale, either above or below the original passage. The progression of a passage may also be imitated by an inversion, or by reversing the movement of the original; also by notes of a greater or of a lesser value. (See CANON; COUNTERPOINT; FUGUE.) Imitation in composition is one of the most important means of producing unity and animation in the progression of the parts and is used in a strict and also in a free manner. Many composers, however, resort to imitation improperly, either from poverty of musical ideas or from pedantry. In the works of the contrapuntal writers of the Netherlands examples of retrograde imitation are found. This is hardly legitimate art.

IMITATION IN ANIMALS. The patterning of the behavior of one animal after that of another. It has been suggested that imitation in animals might be limited to the mode of learning in which one animal acquires a new form of behavior by copying the performance of another—a definition that excludes unconscious imitative movements which do not become the basis of an habitual form of response. The wider usage is, however, more generally accepted. The broadest definition of imitation as the copying of any model whatever (see IMITATION) has not been used by comparative psychologists.

Imitation implies attention on the part of the imitating animal to the movements to be imitated. The attention may be of any degree. Further the performance copied must be repeated more or less successfully by the imitator. In certain experiments upon monkeys an untrained individual was placed in a cage with a second who had learned to obtain food by pulling one of several strings. In many cases the untrained monkey was aided in his effort to obtain food by observing the behavior of its companion. Two degrees of attention were apparent—one in which the untrained animal merely watched the other, and one in which it followed the other about. There were three levels of success: (1) a spatial discrimination, in which the monkey went to the right place in the cage; (2) an objective discrimination, in which the monkey not only went to the right place but also handled the mechanism (e.g., the string) by which the food was obtained; (3) a complete imitation, in which the animal went to the right place and immediately made the right movement to secure the food.

On the psychological side we may distinguish three kinds of imitation—two in which the imitation as such is unconscious, one in which it is conscious. 1. In *automatic imitation* the imitative movement is set off at once by the perception of the movement in another individual. The movement is not consciously anticipated; it lacks a motive. It is to be explained by reference to an already established tendency, which is usually innate. Hence this form of imitation has also been called instinctive. An example may be seen in the pecking movements of the chick. The movements are instinctive; but they are also imitative, because they are usually first set off by the pecking of another chick or of the hen. In the absence of previous experience in food getting the action cannot be determined by the idea of the satisfaction of hunger (inferential imitation); nor can it, in its immediate perfection, be the result merely of especial interest in the object at which the peck is directed (focal imitation). 2. *Focal imitation* involves a high degree of attention on the part of the imitator to the movement subsequently imitated. The attention is usually determined by some aspect of the situation which makes a strong appeal to the animal. In the experiments with monkeys it was the sight of the food that aroused the interest of the animal in the movements connected with the getting of food. This interest, dependent upon the focal position of the perception of the movement, acts as a motive and results in the animal's going to a certain place and handling a given mechanism. After the interest is once aroused, only those processes which represent its object remain focal in the animal's consciousness; the degree of perfection of the imitation depends upon the degree of relevant selectiveness of this interest. Although the *perception* of the end accomplished may have served at the outset to determine attention, there need be no subsequent *idea* of end. 3. *Inferential* (or telic) *imitation* implies the participation of the idea of end in the motive to the imitative action and is therefore consciously imitative. The movements and their result are perceived. Later the idea of the result leads to the idea of the movements and thence to their performance. This form of imitation, involving as it does the free idea, is presumably rare among the lower animals, although common in man. It may be assumed when a complicated imitative act is performed correctly on the first attempt; for the idea of end may be expected to result in a more specific determination of behavior than the selective interest.

Below the vertebrates there is no evidence of imitation, since the lower forms of animals do not ordinarily attend to one another's movements. Among the vertebrates some experimenters have found negative evidence for the capacity of focal or inferential imitation in dogs, cats, white rats, and monkeys; while others, with the last three mentioned forms and with raccoons, are convinced of the possibility of an imitation which is probably of the focal type. It is possible that some monkeys are capable of inferential imitation—a form which, as we have seen, involves the free idea, and thus a higher degree of intelligence than is generally found in the animal world. Consult: Washburn, *Animal Mind* (New York, 1908); Haggerty, "Imitation in Monkeys," in *Journal of Comparative Neurology and Psychology*, vol. xix (Granville, Ohio, 1909); Thorndike, *Animal Intelligence* (New York, 1912). See IMITATION; also ANIMAL PSYCHOLOGY; INSTINCT; INTELLIGENCE IN ANIMALS.

IMITATION OF CHRIST (Lat. *De Imitatione Christi*). The most widely read, after the Bible, of all spiritual books. It is a series of counsels for the attainment of perfection, written in a spirit of sincere and humble piety, interspersed with prayers and colloquies between Christ and the devout soul. It was originally written in Latin. It is strange that the authorship of a book so popular and comparatively so recent should have been the subject of one of the most curious controversies in literary history. Following his own counsels of humility, the author concealed his name. The oldest certainly dated manuscripts—the Wolfenbüttel (1424), the Gaesdonck (1427), and the Roolf (1431)—are all anonymous. The book was attributed with more or less positiveness to as many as 35 different authors, including St. Bernard, Innocent III, and John Scotus Erigena. The choice finally narrowed to three—Thomas à Kempis, the great Chancellor Gerson (q.v.), and a person of the name of John Gersen, a Benedictine abbot of Vercelli. Most of the fifteenth-century printed copies bear the Chancellor's name; but the proportion alters in the sixteenth, and the claimant Gersen, or Gesen, appears for the first time in 1604. The controversy raged acrimoniously in religious orders, universities, and even the Parliament of Paris. Between 1615 and 1837 no less than 150 works devoted to the question appeared in France alone. The weight of evidence, both internal and external, has for a long time been considered to rest on the side of Thomas à Kempis (q.v.). The book was finished in 1421 and first printed at Augsburg, probably between 1470 and 1472. The best critical edition of the Latin text is by C. Hirsche (Berlin, 1874; 2d ed., 1891). Consult: Kettlewell, *The Authorship of the De Imitatione Christi* (London, 1777); Malou, *Recherches historiques et critiques sur le véritable auteur du livre de l'Imitation* (3d ed., Louvain, 1858); Wheatley, *The Story of the Imitatio Christi* (London, 1891); Cruise, *Who Was the Author of the Imitation?* (ib., 1898); Montmorency, *Thomas à Kempis: His Age and his Book* (ib., 1906); and an excellent bibliography by a learned modern defender of the Gersen theory, Wolfsgruber, in *Giovanni Gersen, sein Leben und sein Werk De Imitatione Christi* (Augsburg, 1880).

IMITATIVE INSANITY, INDUCED MANIA, INSANITY BY IMITATION. These old terms were adopted upon a mistaken notion. It has been supposed that sane people became insane through imitation of maniacs, through too constant intercourse with them, or through the efforts of a strong imagination in the sane. This is untrue. The physicians or nurses who become insane while living in institutions for those of unsound mind are affected because of stress of overwork or alcoholism, or other debilitating cause which would have been operative had they been engaged in other vocations. Insane people are imitative. Frequently cases occur in a family in which a sister, previously unsuspected of being insane, betrays the delusions and adopts the obsessions of an avowedly maniacal sister. This is called *folie à deux*, or "communicated insanity." The insanity exists first, and then the imitation occurs. Imitation of crimes upon reading of them or seeing them committed is due to idiocy (q.v.) or hysteria (q.v.) in most cases.

IM′LAC. A character in Dr. Johnson's *Rasselas*.

IMMACULATE CONCEPTION OF THE VIRGIN MARY. A dogma of the Roman Catholic church, promulgated by Pope Pius IX in 1854. It declares that the "doctrine which holds the blessed Virgin Mary, from the first instant of her conception, to have been kept free from all stain of original sin, by the singular grace and privilege of Almighty God, in view of the merits of Christ Jesus the Saviour of mankind, is revealed by God, and therefore firmly and constantly to be believed by all the faithful."

Previous to 1854 Roman Catholic theologians had commonly believed in the immaculate conception, but it was held only as a "pious opinion," not as a dogma. Its history may be traced from early times and shows gradual enlargements. The New Testament is silent on the subject of Mary's conception. In the ancient Church many persons believed in her perpetual virginity, and this found expression in some of the apocryphal Gospels. Belief seems next to have advanced to her sinlessness after the birth of Christ, then to sinlessness from her own birth, and finally to the idea that she was sinless from her very conception; Roman Catholics believe that the modern definition involves its having been held, at least implicitly, from the first. The fact that Mohammed seems to have known of these Christian tenets (cf. *Koran*, Sura, iii) is an indication that they were widespread among the Asiatic churches at an early date. The Eastern church, however, has not formulated the dogma, and to this day the immaculate conception remains only a pious opinion in that great branch of Christendom. In the West the history of the doctrine is closely associated with that of the feast. An effort was made in Lyons, in 1139, to introduce the festival of the Immaculate Conception; but it met with pronounced opposition from Bernard of Clairvaux, who did not accept the doctrine exactly as generally explained, and urged that the feast had not received official sanction from Rome. A prolonged controversy broke out early in the fourteenth century, which rather involved a minute technical point of the exact moment of her sanctification than the absolute acceptance or rejection of the main doctrine. The Schoolmen took opposite sides, Duns Scotus and the Scotists maintaining the doctrine in its exactness, while the Thomists, following their leader, Thomas Aquinas, opposed it. The dispute extended to the two great mendicant orders. Scotus was a Franciscan, Thomas a Dominican. The Franciscans accordingly sided with the Scotists in supporting the doctrine; the Dominicans sided with the Thomists in opposing it. There were keen debates, and mutual charges of heresy. The influential University of Paris at first sided with the Dominicans and Thomists; but afterward its position was reversed, and by the end of the fifteenth century it required from every candidate for its doctorate an oath to defend the truth of the immaculate conception wherever it was denied. Among many other forces which worked towards the same end, we may mention the favorable action of the Council of Basel (1439), the pronouncements of Pope Sixtus IV (especially his constitution *Grave nimis*, in 1483), the decrees of Trent, excepting Mary from the universal curse of original sin (Session V, 1546), and the strong support of the Society of Jesus (e.g., in the person of Bellarmine). In 1622 Pope Gregory XV forbade any one (with the conspicuous exception of the Dominicans, and these only in discussions among themselves) to teach that the Virgin Mary was stained by original sin. About 40 years later (1661) Alexander VII set forth the belief of the Church in terms very like those of the decree of 1854. Yet in spite of the general acceptance of the doctrine, the most that could be said for it down to modern times was what Benedict XIV cautiously affirmed, about the middle of the eighteenth century: "The Church inclines to the opinion of the immaculate conception."

Pius IX was assiduously devoted to the cult of the Virgin. In 1849 he addressed a circular letter to the bishops, inviting their opinions on the advisability of defining the dogma of her immaculate conception. Out of some 600 replies, the great majority favored the proposed action. Four opposed it. Several influential bishops, especially in Germany and France, deemed it inopportune, inexpedient, and possibly injurious to the Church. In view of the generally favorable sentiment, however, the Pope proceeded to promulgate the dogma, as stated above. The decree was read in the presence of about 200 cardinals, archbishops, and bishops, assembled in St. Peter's, on Dec. 8, 1854, the Feast of the Immaculate Conception. Although not a conciliar decision, it has binding force for the whole Roman Catholic world.

In explanation of the dogma, Catholic writers sometimes quote from a sermon by Bossuet, delivered on a Feast of the Immaculate Conception, in which he thus addresses Christ: "Thou art innocent by nature, Mary only by grace; Thou by excellence, she only by privilege; Thou as Redeemer, she as the first of those whom Thy precious blood hath purified." The Catholic interpretation of the matter is clearly implied in these few words. For Roman theologians distinguish between "active" and "passive" conception. The former is the physical act of the parents, and, so far as this is concerned, Mary is held to have been conceived like other mortals. The latter is the divine infusion of the rational soul (on the theory of creationism), and this, in the case of Mary, is held to have been accompanied by a special gift of grace, whereby she differs from all other mortals. She was sanctified, and therefore sinless, from the beginning. But this was through the merits of the Son who was to be born from her, not through independent merits of her own. In this way the Church believes that it solves the two main problems raised by the doctrine of the immaculate conception—first, how it affects the Virgin Mary in her relation to the rest of the human race, and, secondly, how it affects her in relation to Christ. See Gen. iii. 15; Luke i. 28, 42.

The Feast of the Immaculate Conception, in the Roman calendar, falls on December 8; in the Greek calendar, on the day following.

Consult: Passaglia, *De Immaculato Deiparæ Semper Virginis Conceptu* (3 vols., Rome, 1854–55); Addis and Arnold, *Catholic Dictionary*, art. "Immaculate Conception" (London, 1884); Wetzer and Welte, *Kirchenlexikon*, iv (Freiburg, 1886); Ullathorne, *The Immaculate Conception of the Mother of God* (2d ed., London, 1904). On the Protestant side, consult: Schaff, *Creeds of Christendom* (New York, 1877), which gives the history of the doctrine, and the Latin and English text of the constitution *Ineffabilis Deus*.

IMMAN'UEL. See EMMANUEL.

IMMEMORIAL. Of great antiquity, reaching back beyond memory or record. As a legal term, a right or usage of such long continuance that its origin cannot be traced. Specifically, in English law, a right or usage running back to the accession of Richard I to the throne (1189). Rights resting upon custom, whether the general custom of the realm or the local custom of a community or of a particular calling, depend for their validity on the proof or on the presumption that the custom has been generally observed and practiced from that date. As in most cases the fact cannot be established by direct proof, the person relying upon the custom is aided by a presumption of law that if it has been in existence during the period of living memory its previous existence from the time of Richard I will be presumed. This presumption may, however, be rebutted by showing, if that be possible, that the custom did not in fact exist, or that it could not have existed, at that remote period.

This doctrine, which the lapse of time has converted into an absurdity, still prevails generally in England and in some of the United States, where it has been held that no customary right can exist in America by reason of the fact that it could not have been practiced in the reign of Richard I. In most American States, however, it has been superseded by a more reasonable doctrine, giving effect to a custom which has been in existence during the period of living memory, or in some instances during a fixed period of time, usually 20 years. In England also it has been provided by statute (Prescription Act, 1832) that rights to claims of common, etc., may be established by showing an uninterrupted enjoyment as of right—in some cases for 30, in others for 20, years. See Common; Custom; and for the modern doctrine governing the acquisition of private rights, as easements and profits *à prendre* in another's land by long-continued use, see Easement; Prescription.

IM'MER GOOSE. See Loon.

IM'MERMANN, Karl (1796–1840). A German dramatist, born in Magdeburg, April 24, 1796. From the Gymnasium of Magdeburg Immermann went in 1813 to the University of Halle to study law, but he interrupted his studies to take part in the War of Liberation. Disabled by a nervous disorder, he left the field in 1815 and returned to Halle, where his brave protest to the King at the brutal treatment of a dissenting fellow student by the overzealous student societies embroiled him with the latter. He entered the government service and in 1824 became a judge. He had already in Münster become acquainted with Countess Elise von Ahlefeldt (1788–1855), with whom he lived on terms of intimacy for years. He had become widely known as a dramatist when, in 1835, he took charge of the Düsseldorf theatre, which he developed artistically; but the theatre failed for the lack of proper financial support, and he became a judge again. Immermann married Marianne Niemeyer in 1839 and died Aug. 25, 1840. His plays were strongly influenced by Shakespeare. Among his best pieces are *Das Trauerspiel in Tirol* (1827) and *Merlin* (1831). Two representative novels are *Die Epigonen* (1835), an echo of *Wilhelm Meister*, and *Münchhausen* (1838–39), in which the village life of Westphalia is imaginatively described. The beautiful prose idyl *Der Oberhof*, contained in this book, is his best-known work. Here, too, Poe may have found a hint for *The Fall of the House of Usher*. He stood at the turning point between romanticism and realism. Immermann's *Collected Works* appeared at Düsseldorf in 1835–43, and a new edition, with *Biography and Introduction*, came out in 20 volumes at Berlin in 1883; a new edition in six volumes appeared in 1911. Consult: Putlitz, *Karl Immermann, sein Leben und Werke* (Berlin, 1870); E. Schmidt, *Charakteristiken*, i (ib., 1886); Kaiser, *Untersuchungen zu Immermanns Romantechnik* (Halle, 1906); Thewissen, *Goethes Einfluss auf Immermanns Romane* (Marburg, 1907).

IMMER'SION. See Baptism; Emersion.

IM'MIGRA'TION (from Lat. *immigrare*, to remove into, from *in*, in + *migrare*, to migrate). In its broadest sense, the transfer of residence from one country to another, viewed from the standpoint of the country in which the new residence is taken. The causes of this phenomenon have been discussed in the article devoted to emigration, which treated the movement at its source. We are concerned here with the effect of these movements on the countries which receive the newcomers. The invasion of the immigrant is the movement of the individual who seeks to improve his condition by a change of residence, who submits to the political institutions of the land of his adoption, and whose coming thither is frequently openly encouraged, or at least not actually opposed, by the country in which he settles.

Immigration and colonization are intimately related. When a new country is to be developed and its resources increased by human labor, immigration is encouraged by its authorities, and every gain in population is deemed an economic advantage. It has been in such countries in the past century into which the flow of emigration from Europe has been poured. They are Australia, South America, Canada, and the United States, in each of which immigration has raised diverse social and economic questions which must be individually studied and do not lend themselves to a general treatment. Before turning to the United States, where the immigration problem is perhaps the most acute, we may briefly consider the facts connected with immigration in other countries.

Australia. The Australian Commonwealth owes its origin to the penal settlement established there by Great Britain at the close of the eighteenth century, to which a considerable number of convicts were deported until the middle of the last century, when, at the earnest solicitation of the colonials, the system was abandoned. Efforts were made by the government to send out free colonists to Australia, but, despite the liberal assistance of the government, the total population by 1851 was only 430,596. Following the discovery of gold in 1850, the population increased threefold in the next 10 years, and considerable increments have been made to it at each subsequent census.

The following table gives the increase of population ascribed to the excess of immigration over emigration. In 1904 the emigration exceeded the immigration by 2889.

1851–1860	613,253
1861–1870	291,342
1871–1880	336,297
1881–1890	386,018
1891–1900	63,482
1912–1913	83,741

The colonies showed great variations from year to year, as the discovery of gold in one colony after another attracted the fortune seekers. The distance of Australia from Europe and the cost of passage have been an obstacle to immigration to that country compared with the more accessible Canada and the United

States. The attractive force of the gold mines has partially offset the difficulty, while the colonies at one time generally pursued a policy of aiding immigrants by paying a portion, if not all, of the passage money. Up to 1896 there had been introduced into the colonies, either wholly or partially at the expense of the state, no less than 756,695 persons, of whom 578,559 came in the period prior to 1881.

Under these circumstances the Australian colonies have to a large extent chosen their immigrants. It is not surprising, therefore, that the great bulk of the immigrants into Australia have been natives of the United Kingdom. According to the census of 1891, 68.58 per cent of the population were Australian born, 14.76 per cent born in England and Wales, 3.86 per cent in Scotland, 7.13 per cent in Ireland. According to the census of 1901, 76.99 per cent of the population, exclusive of aborigines, were Australian born; 10.30 per cent were born in England and Wales; 2.78 per cent in Scotland; 5.13 per cent in Ireland; leaving only 4.80 per cent natives of other British colonies and foreigners. Immigration in later years has maintained practically the same character; its volume has remained so small as not to affect the general population as indicated by the 1901 census.

South America. Of the South American countries, the Argentine Republic, Brazil, and Uruguay are the only ones in which immigration brings any considerable increment to the population. In Uruguay the immigration varies between 8000 and 10,000 persons annually. In Brazil 2,845,980 are reported for the years 1835–1912. In the Argentine Republic the immigration in the years 1857–1912 was 4,248,355, consisting of 2,133,508 Italians, 1,298,122 Spaniards, 206,912 French.

In the immigration to the South American countries the states of southern Europe are the largest contributors. Italy stands at the head of the list. In the immigration of Brazil the Portuguese take the first place, followed by the Spaniards and the Italians.

Canada. There is greater difficulty in determining the amount of immigration to Canada than to other countries, not only because a large number of persons land there whose destination is the United States, but because a considerable number whose original intention was to remain in Canada drift into the United States. So great is the difficulty of precisely ascertaining the number that a few years ago the Canadian authorities gave up the attempt. The most recent figures obtainable are put forward by the authorities with many cautions as to their accuracy. In six periods the figures are as follows:

ANNUAL AVERAGE IMMIGRATION TO CANADA

1871–1875	34,212
1876–1880	36,304
1881–1885	115,413
1886–1890	40,911
1901–1905	104,298
1908–1913	284,691

A computation by British authorities that, from 1815 to 1889, 12,481,708 persons emigrated from the United Kingdom, showed that of these 8,317,019 went to the United States, 1,987,247 to Canada, and 1,663,388 to Australasia.

The immigration into Canada is largely from the mother country and the United States. The census of 1901 showed that there were 684,671 foreign born in the population, of whom 127,899 were natives of the United States. The United Kingdom furnished 386,545; other parts of the British Empire furnished 19,338, while the quota of foreign nations, among whom Germans and Russians predominated, was 150,889. In the period 1908–13 the United States furnished 557,800 immigrants to Canada out of 1,423,455; England and Wales furnished 371,745.

United States. The great bulk of those who have left Europe to seek new homes have come to the United States. Here the various phenomena connected with immigration can be studied in their fullest development. Records of immigration to the United States begin in 1820. For the period before that time the chief sources of information as to immigration are the frequent newspaper allusions to the arrival of vessels bringing immigrants, of whom a certain number were "foreigners," i.e., those who spoke a language other than English. The record of arrivals since 1820 is shown in the accompanying table:

NUMBER OF IMMIGRANTS ARRIVING IN THE UNITED STATES EACH YEAR FROM 1820 TO 1914

Year ending September 30

1820	8,385	1827	18,875
1821	9,127	1828	27,382
1822	6,911	1829	22,520
1823	6,354	1830	23,322
1824	7,912	1831	22,633
1825	10,199	Oct. 1, 1831, to Dec. 31, 1832	60,482
1826	10,837		

Year ending December 31

1833	58,640	1839	68,069
1834	65,365	1840	84,066
1835	45,374	1841	80,289
1836	76,242	1842	104,565
1837	79,340	Jan. 1 to Sept. 30, 1843	52,496
1838	38,914		

Year ending September 30

1844	78,615	1849	297,024
1845	114,371	1850	310,004
1846	154,416	Oct. 1 to Dec. 31, 1850[1]	59,976
1847	234,968		
1848	226,527		

Year ending December 31

1851	379,466	1855	200,877
1852	371,603	1856	195,857
1853	368,645	Jan. 1 to June 30, 1857	112,123
1854	427,833		

Year ending June 30

1858	191,942	1887	490,109
1859	129,571	1888	546,889
1860	133,143	1889	444,427
1861	142,877	1890	455,302
1862	72,183	1891	560,319
1863	132,925	1892	479,663
1864	191,114	1893	439,730
1865	180,339	1894	285,631
1866	332,577	1895	258,536
1867	303,104	1896	343,267
1868	282,189	1897	230,832
1869	352,783	1898	229,299
1870	387,260	1899	311,715
1871	321,350	1900	448,572
1872	404,806	1901	487,918
1873	459,803	1902	648,743
1874	313,339	1903	857,046
1875	227,498	1904	812,870
1876	169,986	1905	1,026,499
1877	141,857	1906	1,100,735
1878	138,469	1907	1,285,349
1879	177,826	1908	782,870
1880	457,257	1909	751,786
1881	669,431	1910[1]	1,041,570
1882	788,992	1911	878,587
1883	603,322	1912	838,172
1884	518,592	1913	1,197,892
1885	395,346	1914	1,218,480
1886	334,203		

In long periods the increase is marked, but year by year the fluctuation is considerable.

It mirrors the economic conditions at home and abroad. Thus, the panic of 1837 is reflected in the decline of immigration from 79,340 in that year to 38,914 in 1838. The wholesale emigration from Ireland after the potato famine is reflected in the rise of American immigration from 154,416 in 1846 to 234,968 in 1847, and before this influence and that of the political disturbances in Europe were spent came the discovery of gold and the rush to the mines, which culminated in an immigration of 427,833 in 1854, a figure not reached again until nearly 20 years later. After that year immigration fell off slightly, and received a sudden check after the panic of 1857, when it was reduced from 246,945 in 1857 to 119,501 in 1858. The year 1860 showed symptoms of a rising tide, but this was checked by the outbreak of the Civil War. The prosperous times which followed the close of the war increased immigration until, in 1873, it reached a figure of 459,803, higher than in 1854. Again economic distress brought a falling off, and in 1878 it was not more than 138,469. But the symptoms of returning prosperity in the early eighties reacted powerfully upon the volume of immigration, which in 1882 reached the enormous total of 788,992. By 1886 immigration had fallen to 334,203, but it soon recovered and maintained high figures until 1893. In the following year it dropped to 285,631 and reached its lowest point in recent years in 1898, when it was 229,299; but again there was a rapid recovery, and in 1903 the total was 857,046. In 1904 the number fell off slightly, but in 1905, 1906, and 1907 it passed the million mark. In 1908 and 1909, as a result of the crisis of 1907, the number of immigrants fell to 782,870 and 751,786, but rose again in 1910 to over 1,000,000. In the year 1914 the number of immigrants was 1,218,480—a point reached only once before in the history of American immigration.

Influenced by temporary causes, as we have seen, the progress of immigration has been generally forward, with setbacks, apparently temporary, only in the decades 1861–70 and 1891–1900. In estimating the force of immigration it is well to take into account the concurrent growth of the population. The following table brings out the facts:

DECADE	Population at beginning	Immigrants	Immigrants in 10 years per 1000 of initial population
1821–1830	9,633,822	143,439	15
1831–1840	12,866,020	599,125	47
1841–1850	17,069,453	1,713,251	100
1851–1860	23,191,876	2,598,214	110
1861–1870	31,443,321	2,314,824	73
1871–1880	38,558,371	2,812,191	73
1881–1890	50,155,783	5,246,616	104
1891–1900	62,622,250	3,844,420	61
1901–1910	75,994,575	8,795,386	116

It appears in this table that the greatest relative immigration has been in the 10 years ending 1910, closely followed by the decades 1861–70 and 1881–90, and it is to be noted that in each of these periods the agitation against the policy of unrestricted immigration was widespread.

The effect of this immigration on the population can be traced since 1850 in the number of foreign born enumerated by the census and is shown in the following table:

YEAR	Population	Foreign born	Per cent foreign born	Increase of foreign born over previous census	Immigration previous decade
1850	23,191,876	2,244,602	9.7		
1860	31,443,321	4,138,697	13.2	1,894,095	2,598,214
1870	38,558,371	5,567,229	14.4	1,428,532	2,314,824
1880	50,155,783	6,679,943	13.3	1,112,714	2,812,191
1890	63,069,756	9,308,104	14.8	2,628,161	5,246,613
1900	76,303,387	10,460,085	13.7	1,151,981	3,687,564
1910	91,972,266	13,515,886	14.7	3,174,610	8,795,386

While the total number of the foreign born has increased at each census, the proportion to the total population has not materially changed since 1860. The increase in the foreign born for each decade falls far short of the total number of immigrants by reason of the following factors: (1) deaths among the foreign born present at the beginning of the decade, and (2) emigration from among the same; (3) deaths among the immigrants during the decade, and (4) return of some of these latter to their native lands. The number who return to their country of origin fluctuates, like immigration, with prosperity and depression. Thus, in 1908, 395,073 aliens emigrated, whereas in the five years 1909–13 the average annual emigration of aliens amounted to only 273,071.

The developments of recent years are shown in the following figures:

INHABITANTS	Per cent of total immigration						
	1821–1830	1851–1860	1871–1880	1881–1890	1891–1900	1901–1905	1906–1910
United Kingdom	76.5	54.5	43.5	29.9	19.4	10.0	9.3
Germany	6.8	38.2	34.3	30.7	14.1	4.6	3.2
Sweden, Denmark, and Norway	0.2	1.0	11.2	16.0	9.9	7.6	4.1
Italy, Russia, Poland, and Austria-Hungary	0.3	0.4	8.1	19.4	49.3	66.8	62.5
All others	16.0	5.9	2.9	4.0	7.3	10.9	20.9

There has been of late years a change in the character of immigration, and much has been written of the "undesirable" quality of recent immigration. The most desirable immigrant is doubtless he who promises most rapidly to be absorbed into the great mass of our population and lose his identity as a newcomer. Kinship in language and race is the prime mark of this desirability. Other things being equal, English-speaking immigrants are preferable to all others, those of allied race and language more to be desired than those allied by neither race nor language to the mass of the people.

The last decade shows marked contrasts with the first. Then more than three-quarters of American immigrants spoke English, but now this element represents less than one-fifth of the total. This relative decline was at first made up by an influx of Germans and Scandinavians, peoples of a certain racial kinship, who as late as the decade 1881–90 comprised nearly one-half of the immigrants, while in the later periods the nations of southern and eastern Europe have assumed the leadership. Equally instructive is the separation of the immigrants by race, which for the fiscal years 1904 to 1914 is shown in the following table:

RACES	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
African (black)	2,386	3,598	3,786	5,235	4,626	4,307	4,966	6,721	6,759	6,634	8,447
Armenian	1,745	1,878	1,895	2,644	3,299	3,108	5,508	3,092	5,222	9,353	7,785
Bohemian and Moravian	11,911	11,757	12,958	13,554	10,164	6,850	8,462	9,223	8,439	11,091	9,928
Bulgarian, Servian, Montenegrin	4,577	5,823	11,548	27,174	18,246	6,214	15,130	10,222	10,657	9,087	15,084
Chinese	4,327	1,971	1,485	770	1,263	1,841	1,770	1,307	1,608	2,022	2,354
Croatian and Slovenian	21,242	35,104	44,272	47,826	20,472	20,181	39,562	18,982	24,366	42,499	37,284
Cuban	4,811	7,259	5,591	5,475	3,323	3,380	3,331	3,914	3,155	3,099	3,539
Dalmatian, Bosnian, Herzegovinian	2,036	2,639	4,568	7,393	3,747	1,888	4,911	4,400	3,672	4,520	5,149
Dutch and Flemish	7,832	8,498	9,735	12,467	9,526	8,114	13,012	13,862	10,935	14,507	12,566
East Indian	258	145	271	1,072	1,710	337	1,782	517	165	188	172
English	41,479	50,865	45,079	51,126	49,056	39,021	53,498	57,258	49,689	55,522	51,746
Finnish	10,157	17,012	14,136	14,860	6,746	11,687	15,736	9,779	6,641	12,756	12,805
French	11,557	11,347	10,379	9,392	12,881	19,423	21,107	18,132	18,382	20,652	18,166
German	74,790	82,360	86,813	92,936	73,038	58,534	71,380	66,471	65,343	80,865	79,871
Greek	12,625	12,144	23,127	46,283	28,808	20,262	39,135	37,021	31,566	38,644	45,881
Hebrew	106,236	129,910	153,748	149,182	103,387	57,551	84,260	91,223	80,595	101,330	138,051
Irish	37,076	54,266	40,959	38,706	36,427	31,185	38,382	40,246	33,922	37,023	33,898
Italian (north)	36,699	39,930	46,286	51,564	24,700	25,150	30,780	30,312	26,443	42,534	44,802
Italian (south)	159,329	186,390	240,528	242,497	110,547	165,248	192,673	159,638	135,830	231,613	251,612
Japanese	14,382	11,021	14,243	30,824	16,418	3,275	2,798	4,575	6,172	8,302	8,941
Korean	1,907	4,929	127	39	26	11	19	8	33	64	152
Lithuanian	12,780	18,604	14,257	25,884	13,720	15,254	22,714	17,027	14,078	24,647	21,584
Magyar	23,883	46,030	44,261	60,071	24,378	28,704	27,302	19,996	23,599	30,610	44,538
Mexican	447	227	141	91	5,682	15,591	17,760	18,784	22,001	10,954	13,089
Pacific Islander	41	22	13	3	2	7	61	12	3	11	1
Polish	67,757	102,437	95,835	138,033	68,105	77,565	128,348	71,446	85,163	174,365	122,657
Portuguese	6,338	4,855	8,729	9,648	6,809	4,606	7,657	7,469	9,403	13,566	9,647
Rumanian	4,364	7,818	11,425	19,200	9,629	8,041	14,199	5,311	8,329	13,451	24,070
Russian	3,961	3,746	5,814	16,807	17,111	10,038	17,294	18,721	22,558	51,472	44,957
Ruthenian (Russniak)	9,592	14,473	16,257	24,081	12,361	15,808	27,907	17,724	21,965	30,588	36,727
Scandinavian	61,029	62,284	58,141	53,425	32,789	34,996	52,037	45,859	31,601	38,737	36,053
Scottish	11,483	16,144	16,463	20,516	17,014	16,446	24,612	25,625	20,293	21,293	18,997
Slovak	27,940	52,368	38,221	42,041	16,170	22,586	32,416	21,415	25,281	27,234	25,819
Spanish	4,662	5,590	5,332	9,495	6,636	4,939	5,837	8,068	9,070	9,042	11,064
Spanish-American	1,666	1,658	1,585	1,060	1,063	890	900	1,153	1,342	1,363	1,544
Syrian	3,653	4,822	5,824	5,880	5,520	3,668	6,317	5,441	5,525	9,210	9,023
Turkish	1,482	2,145	2,033	1,902	2,327	820	1,283	918	1,336	2,015	2,693
Welsh	1,820	2,531	2,367	2,754	2,504	1,699	2,244	2,248	2,239	2,820	2,558
West Indian (except Cuban)	1,942	1,548	1,476	1,381	1,110	1,024	1,150	1,141	1,132	1,171	1,396
Other peoples	668	351	1,027	2,058	1,530	1,537	3,330	3,323	3,660	3,038	3,830
Total	812,870	1,026,499	1,100,735	1,285,349	782,870	751,786	1,041,570	878,587	838,172	1,197,892	1,218,480

That such a notable change in the character of immigration must affect the composition of the foreign born in the United States is obvious and is disclosed in the following statement from the censuses of 1900 and 1910:

FOREIGN-BORN POPULATION, 1910, 1900, AND 1890, BY NATIONALITIES

NATIVES OF	FOREIGN BORN, 1910		FOREIGN BORN, 1900		FOREIGN BORN, 1890	
	Number	Per cent	Number	Per cent	Number	Per cent
England, Scotland, and Wales	1,221,283	9.0	1,169,737	11.3	1,251,402	13.5
Ireland	1,352,251	10.0	1,618,567	15.6	1,871,509	20.2
Germany	2,501,333	18.5	2,666,990	25.8	2,784,894	30.1
Sweden, Norway, and Denmark	1,250,733	9.3	1,064,309	10.3	933,249	10.1
	6,335,600	46.8	6,519,603	63.0	6,841,054	73.9
Austria-Hungary	1,670,582	12.4	579,042	5.6	303,812	3.3
Italy	1,343,125	9.9	484,207	4.7	182,580	2.0
Russia and Poland	* 1,732,462	12.8	807,606	7.8	330,084	3.6
	5,746,369	35.1	1,870,855	18.1	816,476	8.9
All other countries	1,433,917	18.1	1,966,176	18.9	1,592,017	17.2
Total	13,515,886	100.0	† 10,356,634	100.0	9,249,547	100.0

* In the 1910 census the classification Russia and Poland was dropped and Russia and Finland substituted.

† The total here given differs from that of a previous table, as this does not include Alaska and Hawaii.

These figures show that the older immigration, relatively stronger in the foreign born than in the new arrivals, is still losing ground. In the decades 1891–1910 the absolute number of the foreign born of the first group of races declined; of the entire group only the Scandinavians showed an increase. In the decade 1901–10 the same group, as a whole, shows a further decline, although a slight increase appears in the number of aliens born in Great Britain and in Scandinavia. On the other hand, the absolute numbers of the foreign born from eastern and southern Europe more than doubled.

The reports of the Bureau of Immigration enable us to study many characteristics of the immigrants. That males predominate over females, inasmuch as the immigration embraces so many unmarried men, and so many married men who have left their families behind them, who come to seek fortune in the New World, is well known. It is, however, interesting to note that the proportion of males is increasing. In 1893 to 1895 it was 61.5 per cent of the total; in 1896 to 1900, 63.5 per cent; and in the two fiscal years, 1904 and 1905, it averaged as much as 69.2 per cent. In 1914, however, it declined to 65.4 per cent. The older immigration was by families to a larger extent than at present, and this is seen by comparing some of the older and newer elements in it.

OCCUPATIONS	FISCAL YEARS 1881–90		FISCAL YEAR 1905		FISCAL YEAR 1913	
	Number	Per cent	Number	Per cent	Number	Per cent
Professional	27,006	1.0	13,643	1.7	13,469	1.5
Skilled labor	540,411	19.6	180,112	22.7	160,108	17.7
Miscellaneous	2,195,292	79.4	600,726	75.6	727,127	80.8
Total with occupation	2,762,709	100.0	794,481	100.0	900,704	100.0
No occupation	2,483,904		232,018		297,188	
Total	5,246,613		1,026,499		1,197,892	

In 1913 the figures for some of the prominent races were as follows:

RACES	Males	Females	Per cent males
English	31,320	24,202	56
Irish	19,072	17,951	51
German	45,974	34,891	57
Scandinavian	25,243	13,494	65
Hebrew	57,148	44,182	56
Italian (south)	176,472	55,141	76
Polish	115,772	58,593	66
Russian	45,633	5,839	89
Croatian and Slovenian	31,590	10,909	74
Greek	35,143	3,501	91

It will be noted that the races which show a less percentage of men than 65 belong, with the exception of the Hebrews, to the older immigration. The Hebrews represent more largely than the other races immigration by families.

Among the immigrants the proportion of persons in the prime of life is always considerable. The increase of the proportion indicates a falling off of family immigration. Figures for the entire period are not uniform, but the following statement shows this characteristic plainly:

PER CENT OF TOTAL IMMIGRATION

FISCAL YEARS	Under 15 years	15–40 years
1893–1895	18.8	71.1
1896–1898	16.1	72.7

FISCAL YEARS	Under 14 years	14–45 years
1903–1904	13.4	80.8
1904–1905	11.1	83.3
1912–1913	12.3	82.4

Considering the same races as in the case of the sexes, we find the percentage of children under 14 in 1913 to be as follows, the average being 12.3:

English	16.1	Italian (south)	11.7
Irish	6.7	Polish	9.9
German	17.8	Russian	3.3
Scandinavian	7.7	Croatian and Slovenian	8.1
Hebrew	22.0	Greek	3.2

Here again it appears that family immigration is especially prominent among the Hebrews and plays a considerable rôle among Germans and natives of Great Britain. The low percentage of children among the Irish is a consequence of the large immigration of unmarried women, and this is true, in some measure, of the Scandinavians.

Statistics of occupation among the immigrants show comparatively few in the professional class or that of skilled laborers. By far the greatest number are in the classes grouped as miscellaneous, in which laborers, farm laborers, and personal and domestic servants make up nearly the entire number. The general results are given in the preceding table.

The figures above given indicate that the relative proportions of professional, skilled, and unskilled have not been greatly affected by the change in the character of immigration. Among the newer immigrants the Greeks and Italians show low percentages of professional and skilled labor, while the Hebrews show a very large percentage of skilled. This is in large measure explained by the specialization of the Hebrews to the needle trades.

	English	German	Hebrew	Italian (south)	Greek
Professional	9.5	4.0	1.5	0.4	0.3
Skilled	44.5	27.5	70.1	11.8	6.3
Miscellaneous	46.0	68.5	28.4	87.8	93.4

The immigrant population, as a whole, shows a high percentage of illiteracy. Of immigrants over 14, for the year 1913, 26.6 per cent were illiterate. Illiteracy is very rare among English, Scandinavian, French, Dutch, and Finnish. It is relatively low among Germans, Magyars, and Hebrews. It runs very high among immigrants from southern and eastern Europe—Italians, Greeks, Dalmatians, Croatians, and Slovenians, Ruthenians, Lithuanians. Illiteracy among immigrants is largely a reflection of the backward state of education in their countries of origin. In the most extreme cases it also reflects racial oppression. Thus, the Croatians and Slovenians, the Bosnians, the Lithuanians, are peoples possessed of a language and historical traditions other than those of the race that dominates popular education. Accordingly it is dangerous to make deductions from literacy statistics as to the mental or even social quality of the immigrants.

Effect upon the Population. The influence of immigration upon the population at large depends not only upon its volume but also upon its diffusion. We have already seen that the foreign born in 1910 constituted 14.5 per cent of the total population of the country; but it is to be noted that the foreign born are concentrated in particular sections. Of the foreign born 84.8 per cent were found in the North (north Atlantic and north Central States). The South had only 5.4 per cent of the foreign born, and the West (mountain and Pacific States), 9.7 per cent. The distribution of the general population in the three sections was as follows: North, 60.6 per cent; South, 32 per cent; West, 7.4 per cent. The States having the highest percentage of foreign born in their population (25–35 per cent) were Massachusetts, Connecticut, and Rhode Island, New York and New Jersey, Minnesota and North Dakota.

The tendencies to concentration by sections are clearly shown in the table on page 14.

There is a marked tendency towards concentration of the foreign born in the cities. According to the census of 1910, while 44.2 per cent of the general population was found in urban communities, 72.2 per cent of the foreign born were living in such communities. In general, the greater the city the greater the relative proportion of foreign born. The following table gives the percentage of total population and of foreign born living in the several classes of urban communities in 1910:

COMMUNITIES	Per cent of total population	Per cent of foreign born
Cities of 2,500–10,000	9.2	8.8
Cities of 10,000–25,000	6.1	7.3
Cities of 25,000–100,000	9.0	62.5
Cities of 100,000–500,000	9.6	14.6
Cities of 500,000 and over	12.5	29.0

Over one-fifth of the population of cities of 100,000–500,000 and nearly one-third of the population of cities of over 500,000 were foreign born.

The census of 1910 shows that the tendency towards settlement in cities characterizes almost all immigrant nationalities. Only the immigrants from Norway, Mexico, and Montenegro show a less percentage urban than that of the native white population. The immigrants from northwestern Europe show a less tendency towards urban concentration than those from southern and eastern Europe—68.3 per cent as compared with 78.6 per cent. The highest percentages of urban concentration among European immigrants are shown by natives of Rumania (91.9) and Russia (87.0)—a fact to be explained by the large Jewish element in the immigration from those countries. But Ireland follows closely with 84.7 per cent, Turkey in Europe with 79.5 per cent, and Italy with 78.1 per cent.

Russia is the country of birth of the largest contingent of the foreign born of New York City and of Philadelphia. German born are the most numerous element in Baltimore, Buffalo, Chicago, Cincinnati, Detroit, Jersey City, Los Angeles, Milwaukee, Newark, Pittsburgh, St. Louis, and San Francisco. Ireland leads in Boston and Washington; Sweden in Minneapolis, Italy in New Orleans, Austria in Cleveland. The Russian born stand second in Baltimore, Milwaukee, Newark, Pittsburgh, and St. Louis; the Germans in Cleveland, New Orleans, and Washington; the Canadians in Boston, Buffalo, Detroit, and Los Angeles; the Irish in Jersey City and Newark; the Italians in New York; the Austrians in Chicago; the Hungarians in Cincinnati; the Norwegians in Minneapolis. As a rule, immigrants are attracted to those cities already having a large population of the same nationality.

The following table gives the cities of 100,000 and over having in 1910 a foreign-born population in excess of 30 per cent of the total:

CITIES	Population	Foreign born	Per cent of foreign born
Boston	670,585	240,722	35.9
Bridgeport, Conn.	102,054	36,180	35.5
Cambridge, Mass.	104,839	34,608	33.0
Chicago	2,184,283	783,428	35.7
Cleveland	560,663	195,703	34.9
Detroit	465,766	156,565	33.6
Fall River	119,295	50,874	42.6
Lowell, Mass.	106,294	43,457	40.9
New Haven	133,605	42,784	32.0
New York	4,766,883	1,927,703	40.4
Newark	347,469	110,655	31.8
Paterson, N. J.	125,600	45,398	36.1
Providence	224,326	76,303	34.0
San Francisco	416,912	130,874	31.4
Worcester, Mass.	145,986	48,492	33.2

But these figures do not display the whole significance of the city concentration, for it will be remembered that immigrants are largely men and adults. The proportion of foreigners among males of voting age is perhaps a more forcible indication of their influence in the community. In 1910 foreign-born males made up the following percentages of males of voting age:

Fall River	63.8
Lowell	58.1
New York	57.8
Paterson	54.7
Chicago	54.2
Cleveland	53.2
Bridgeport	51.9
Detroit	50.2
Worcester	50.0

The significance of this concentration is in its relation to the problem of assimilation. The evidences of assimilation cannot well be treated statistically, and we have only a few indications of it. One of these lies in naturalization. In 1910, of 6,646,817 foreign-born white males, 21 years of age and over, 3,034,117 were naturalized, and 570,772 had taken out their first

NATIVE AND FOREIGN-BORN POPULATION, BY DIVISIONS, 1850–1910

DIVISION OR STATE AND CENSUS YEAR	POPULATION			PER CENT	
	Total	Native	Foreign born	Native	Foreign born
UNITED STATES					
1910	91,972,266	78,456,380	13,515,886	85.3	14.7
1900	75,994,575	65,653,299	10,341,276	86.4	13.6
1890	62,947,714	53,698,154	9,249,560	85.3	14.7
1880	50,155,783	43,475,840	6,679,943	86.7	13.3
1870	38,558,371	32,991,142	5,567,229	85.6	14.4
1860	31,443,321	27,304,624	4,138,697	86.8	13.2
1850	23,191,876	20,947,274	2,244,602	90.3	9.7
GEOGRAPHIC DIVISIONS					
New England					
1910	6,552,681	4,727,571	1,825,110	72.1	27.9
1900	5,592,017	4,146,780	1,445,237	74.2	25.8
1890	4,700,749	3,558,317	1,142,432	75.7	24.3
1880	4,010,529	3,216,917	793,612	80.2	19.8
1870	3,487,924	2,839,923	648,001	81.4	18.6
1860	3,135,283	2,665,953	469,330	85.0	15.0
1850	2,728,116	2,421,867	306,249	88.8	11.2
Middle Atlantic					
1910	19,315,892	14,464,719	4,851,173	74.9	25.1
1900	15,454,678	12,137,119	3,317,559	78.5	21.5
1890	12,706,220	9,960,475	2,745,745	78.4	21.6
1880	10,496,878	8,475,970	2,020,908	80.7	19.3
1870	8,810,806	6,938,201	1,872,605	78.7	21.3
1860	7,458,985	5,904,410	1,554,575	79.2	20.8
1850	5,898,735	4,879,441	1,019,294	82.7	17.3
East North Central					
1910	18,250,621	15,176,855	3,073,766	83.2	16.8
1900	15,985,581	13,360,355	2,625,226	83.6	16.4
1890	13,478,305	10,967,381	2,510,924	81.4	18.6
1880	11,206,668	9,290,038	1,916,630	82.9	17.1
1870	9,124,517	7,462,843	1,661,674	81.8	18.2
1860	6,926,884	5,729,688	1,197,196	82.7	17.3
1850	4,523,260	3,972,423	550,837	87.8	12.2
West North Central					
1910	11,637,921	10,021,226	1,616,695	86.1	13.9
1900	10,347,423	8,814,175	1,533,248	85.2	14.8
1890	8,932,112	7,382,922	1,549,190	82.7	17.3
1880	6,157,443	5,157,244	1,000,199	83.8	16.2
1870	3,856,594	3,184,983	671,611	82.6	17.4
1860	2,169,832	1,823,670	346,162	84.0	16.0
1850	880,335	780,797	99,538	88.7	11.3
South Atlantic					
1910	12,194,895	11,894,901	299,994	97.5	2.5
1900	10,443,480	10,227,450	216,030	97.9	2.1
1890	8,857,922	8,649,397	208,525	97.6	2.4
1880	7,597,197	7,422,939	174,258	97.7	2.3
1870	5,853,610	5,686,766	166,844	97.1	2.9
1860	5,364,703	5,202,203	162,500	97.0	3.0
1850	4,679,090	4,574,180	104,910	97.8	2.2
East South Central					
1910	8,409,901	8,322,076	87,825	99.0	1.0
1900	7,547,757	7,457,189	90.568	98.8	1.2
1890	6,429,154	6,327,040	102,114	98.4	1.6
1880	5,585,151	5,489,989	95,162	98.3	1.7
1870	4,404,445	4,300,578	103,867	97.6	2.4
1860	4,020,991	3,919,056	101,935	97.5	2.5
1850	3,363,271	3,313,901	49,370	98.5	1.5
West South Central					
1910	8,784,534	8,432,342	352,192	96.0	4.0
1900	6,532,290	6,265,203	267,087	95.9	4.1
1890	4,740,983	4,521,263	219,720	95.4	4.6
1880	3,334,220	3,155,108	179,112	94.6	5.4
1870	2,029,965	1,900,701	129,264	93.6	6.4
1860	1,747,667	1,619,670	127,997	92.7	7.3
1850	940,251	852,866	87,385	90.7	9.3
Mountain					
1910	2,633,517	2,180,195	453,322	82.8	17.2
1900	1,674,657	1,372,688	301,969	82.0	18.0
1890	1,213,935	956,656	257,279	78.8	21.2
1880	653,119	492,237	160,882	75.4	24.6
1870	315,385	228,477	86,908	72.4	27.6
1860	174,923	150,716	24,207	86.2	13.8
1850	72,927	68,732	4,195	94.2	5.8
Pacific					
1910	4,192,304	3,236,495	955,809	77.2	22.8
1900	2,416,692	1,872,340	544,352	77.5	22.5
1890	1,888,334	1,374,703	513,631	72.8	27.2
1880	1,114,578	775,398	339,180	69.6	30.4
1870	675,125	448,670	226,455	66.5	33.5
1860	444,053	289,258	154,795	65.1	34.9
1850	105,891	83,067	22,824	78.4	21.6

papers. The following table gives interesting details as to the tendency towards naturalization of the several races.

NATURALIZATION, 1910

COUNTRY OF BIRTH	FOREIGN-BORN WHITE MALES 21 YEARS OF AGE AND OVER, 1910				
	Total	Per cent distribution by citizenship			
		Naturalized	Having first papers	Alien	Citizenship not reported
UNITED STATES					
All countries	6,646,817	45.6	8.6	34.1	11.7
Germany	1,278,667	69.5	7.2	9.9	13.3
Russia	737,120	26.1	13.0	52.4	8.6
Italy	712,812	17.7	7.8	65.7	8.7
Austria	609,347	24.6	9.6	57.3	8.4
Ireland	597,860	67.8	5.8	13.8	12.7
Canada and Newfoundland	533,359	51.0	4.9	28.3	15.9
Canada — French	170.987	44.7	3.9	40.2	11.2
England	437,152	59.4	6.9	18.8	14.9
Sweden	349,022	62.8	11.5	14.9	10.8
Hungary	255,844	14.3	10.1	68.2	7.4
Norway	213,042	57.1	15.2	16.2	11.5
Scotland	133,116	56.5	7.8	21.5	14.3
Denmark	102,398	61.6	12.6	13.8	12.0
Mexico	102,009	10.7	2.3	66.6	20.4
Greece	74,975	6.6	6.1	77.6	9.7
Finland	70,716	30.6	15.9	45.9	7.5
Switzerland	69,241	61.8	9.5	14.9	13.8
Netherlands	59,752	56.8	10.7	19.6	12.9
France	59,661	49.6	8.1	27.8	14.4
Wales	43,054	69.2	4.6	10.3	15.9
Turkey in Asia	32,691	21.2	10.3	59.4	9.1
Portugal	28,693	24.9	3.9	64.3	7.0
Rumania	27,835	28.8	17.7	45.2	8.3
Belgium and Luxemburg	27,619	43.0	14.4	31.5	11.2
Turkey in Europe	22,788	6.5	6.4	79.3	7.8
Bulgaria, Servia, and Montenegro	17,524	4.7	5.2	83.0	7.1
Spain	14,170	16.4	5.8	65.0	12.8
Cuba and other West Indies	9,671	30.6	6.3	44.2	18.9
Central and South America	3,315	34.8	8.2	37.4	19.6

The high percentage of naturalization among the nations furnishing the older immigration is largely accounted for by length of residence in the country. A comparison of the figures for the newer immigration shows considerable differences. Thus, of the Greeks only 12.7 per cent are naturalized or have taken out their first papers, and only 9.9 per cent of the Bulgarians, Servians, and Montenegrins. Of the Finns, 46.5 per cent fall in this class; of the Russians, 39.1 per cent; of the Rumanians, 46.5; of those from Turkey in Asia, 31.5 per cent. The high percentages are indicative of a definite tendency of such races to expatriate themselves, and are to be explained by political conditions of the land whence the immigrants come. Finns, Russian and Rumanian Jews, Armenians and Syrians from Turkey, do not contemplate return.

Another statistical evidence of assimilation is found in the acquisition of the English language. There were enumerated, in 1900, 1,217,280 foreign-born persons over 10 years of age, or 12 per cent of the total, who could not speak English. But many of the foreign born from Great Britain and Ireland and Canada speak English as their mother tongue, as much as 24.5 per cent of all. Allowing for these, the percentage of foreign born who had no English antecedents and who had not acquired English was 18.3. The census reports do not go sufficiently into details to give us any indication how far the inability to speak English was due to unwillingness to acquire it and how far to lack of opportunity, due to recent arrival in the United States. It has already been noted that 2,609,173 of the foreign born had arrived in the preceding decade, and that in the decade the non-English-speaking elements, even allowing for immigration from Canada, approximated three-fourths of the arrivals. That the foreign element is not averse to learning English would seem to be indicated by the fact that among the native whites of foreign parentage the proportion who do not speak English is only 0.6 per cent.

If we turn now to consider the social effects of immigration, we find our testimony chiefly in the statistics of illiteracy, crime, pauperism, and insanity. As one would naturally expect, illiteracy is more common among the foreign born than among the native whites. For 1910 the figures were 12.7 per cent and 3 per cent respectively. The corresponding figures for 1900 were 12.9 and 4.6; for 1890, 13.1 and 6.2. Illiteracy among the foreign born thus tends to decline.

While illiteracy is more common among the foreign born than, among the native born, the children of the foreign born show a lower percentage of illiteracy than those of native parentage. Illiteracy among the children of foreign parentage amounted to 2.2 per cent in 1890, 1.6 per cent in 1900, 1.1 per cent in 1910. The corresponding figures for whites of native parentage were 7.5, 5.7, and 3.7. The superior literacy of the children of foreign parents is doubtless due to the concentration of the foreign born in cities, where educational opportunities are good.

Crime. It is often claimed that the immigrants fill the jails and penitentiaries of the country; and the impression is widespread that, were it not for immigration, there would be little use for such institutions. This impression is entirely erroneous. While it is likely that the foreign born contribute somewhat more than their proportional quota to the army of law breakers, the disproportion is by no means such as to change materially the amount of crime which would occur were there no foreigners in the population. The extent of their influence upon the volume of crime may be briefly studied.

According to the census of 1910, the total number of offenders in prisons on Jan. 1, 1910, was 111,498, of whom 72,797 were white, 19,438 were foreign born. Thus, while the foreign born represented 16.3 per cent of the white population, they contributed 26.7 per cent of the inmates of the prisons. But criminality is largely confined to adulthood and to the male sex. Now, when it is borne in mind that the foreign born constituted 25.1 per cent of the white population over 21, and 27.3 per cent of the white male population over 21, the apparent excess of criminality dwindles to insignificance.

Insanity and Feeble-Mindedness. A much greater excess of the foreign born appears in the figures for the inmates of hospitals for the insane. Of a total of 115,402 white inmates, on Jan. 1, 1910, the foreign born numbered 54,096, or 47 per cent. A larger proportion of foreign born than of native born was to have been expected in the case of the foreign born, on account of the disproportion of male adults. No such figure as 47 per cent can be explained in this way. The fact that the foreign born are concentrated in the cities probably has something to do with the high percentage of insanity. The strain of city life may tend to produce mental disorder; moreover, many cases of insanity that are neglected under rural conditions are of such seriousness under urban conditions as to require detention in hospitals.

Among the feeble-minded the quota provided by the foreign born is naturally small (6.1 per cent). This is chiefly a result of the rigorous selection to which immigrants are subject upon landing. The effects of this selective process seem entirely to disappear in the second generation. The native born of foreign or mixed parentage constitute 23.6 per cent of the white population and contribute 26.5 per cent of the feeble-minded in institutions. Whether this represents a real excess or not is impossible to determine, since the foreign born of foreign parentage are more decidedly urban than the native born of native parentage, and under urban conditions a degree of feeble-mindedness that might be considered innocuous in the country leads to detention in hospitals.

DISTRIBUTION BY OCCUPATIONS OF MALES IN EACH PRINCIPAL ELEMENT OF THE WHITE POPULATION. GAINFULLY EMPLOYED, 1890 AND 1900

OCCUPATIONS	Native born, native parents		Native born, foreign parents		Foreign born	
	1890	1900	1890	1900	1890	1900
Agricultural pursuits	51.4%	47.6%	27.1%	26.0%	25.1%	21.3%
Professional service	4.4	4.4	3.0	3.5	2.2	2.4
Domestic and personal service	8.4	10.5	12.3	13.5	20.1	19.9
Trade and transportation	16.5	18.2	23.3	24.8	15.6	17.5
Manufacturing and mechanical pursuits	19.3	19.3	34.3	32.2	37.0	38.9

Pauperism. Of the 77,734 paupers in almshouses enumerated on Jan. 1, 1910, 33,125 were foreign born, or 42.6 per cent of the total. This is a contingent much in excess of the percentage contribution of the foreign born to the general population, even when allowance is made for the greater proportion of persons of advanced age among the foreign born. Its only adequate explanation is the initial poverty of the immigrant and his failure to become adjusted to American economic conditions. It is notable that the native born of foreign parentage contributed only 13 per cent to the number of paupers in almshouses.

Industrial Effects. Looking at the immigration problem from the economic side, we not infrequently hear a complaint that immigration lowers wages. In prosperous times little is heard of this, but when depression sets in complaint becomes general.

The difficulty here is to determine the facts. So complex are the conditions affecting wages that the Industrial Commission, after hearing the most conflicting evidence on both sides of the question, was forced to conclude that a positive effect of immigration on wages cannot be predicated. The Immigration Commission, appointed in 1907, reached the conclusion that there has been a tendency for immigration to lower the wages and standard of living of industrial workers.

The proposition can be supported by inference rather than by direct proof. If the numbers of the foreign born in a given industry are small, it is contrary to reason to suppose that they have a depressing effect upon wages. This raises the question of the amount of competition in a given industry. To this the answer can be found in the census statistics of occupations. The special report on *Occupations at the Twelfth Census* of the bureau of the census shows the percentage of the various elements in the white population employed in the main occupation groups. The concentration of the foreign born in mechanical and manufacturing pursuits, which was already marked in 1890, is shown by the census of 1900 to be on the increase. An interesting point is the apparent tendency of the native born of foreign parentage to show much the same preferences for the industrial group. The percentage of all three population classes engaged in trade and transportation shows a fairly uniform increase.

The concentration of the foreigners in industrial pursuits, as indicated by this table, is to be correlated with their tendency to gravitate towards the cities already discussed. They have gone to the cities because the latter furnish the opportunities of employment, and this was due to the development of mechanical and manufacturing industries. The proportion of the foreign born in these broad groups is not such as to lead us to infer that they exercise a dominating influence upon wages, even if it could be proved, which is extremely doubtful, that they are any more willing than the native laborer to work for low wages. It can therefore only be in certain specified industries, in which the proportion of the foreign born is very large and in which the pressure for work is considerable, that any appreciable influence upon wages will be exerted. Where they do not thus dominate an industry they conform to the current rate of wages. Investigations of the Commissioner of Labor into the cost of production in the iron and steel industries and in the textile industries amply prove this proposition.

On the other hand, where the foreign born crowd for employment and dominate a given industry, as in the clothing industry in New York and Philadelphia, they reduce the rate of wages, and such a permanent reduction is possible because the standard of living which they adopt is so much inferior to that which is customary among their American competitors. The contest with the sweatshop in our great cities leaves no doubt upon this point. The report of the Industrial Commission furnishes cumulative evidence of this tendency in a few lines of activity to build up industries on a basis of starvation wages which themselves rest upon the ignorance, helplessness, and incapacity of the foreign-born population of the tenement-house districts.

The problem of immigration is a problem of assimilation; and this means conformity to modes of living, modes of thought, and modes of action in many different fields of activity. With respect to the permanent additions to the population, the question which concerns us is as to how far it is desirable that we should continue to recruit what are economically the weakest and least promising classes in the community. The idea that there must always be some one to do rough work has no standing in court. Modern engineering devises mechanical appliances for these purposes, and we have no fear that progress will cease because the human race is unwilling to be mere hewers of wood and drawers of water.

Legislation. It has already been pointed out that immigration into the United States was so much a matter of course that before 1820 it was not even recorded. While in that year records of the number of arrivals were introduced, nothing was done in the way of legislation, either to promote or to restrict immigration into the United States, until the year 1864.

We may disregard the brief period in which the famous Alien Law was in force (1798–1801), which authorized the President to expel foreigners dangerous to the peace of the nation, for this law was passed to meet a supposed political danger and not to avert a threatened economic injury. Nor did the agitation against the foreigner, which gained such force in the Know-Nothing movement during the early part of the fifties, lead to legislation. It is doubtful if the question would have assumed so large an importance had it not been for popular discontent with the older political parties. Moreover, the agitation was quite as much anti-Catholic as it was antiforeign, and no majority of the American people could be gained for an attitude savoring of religious persecution.

The police and sanitary regulations, including quarantine, affecting the immigrants upon their landing in the United States were matters of State, and not Federal legislation.

When, in 1864, Congress finally took cognizance of the immigration question, it was with the idea of encouraging immigration into the United States. Under the pressure of the demand for laborers in industrial pursuits, an act was passed to encourage immigration which offered to the immigrants freedom from compulsory military service, and the services, upon their arrival, of a commissioner of immigration, whose duty it was to assist immigrants in obtaining transportation to their destination and to protect them from the impositions to which their ignorance exposed them. The Act was repealed in 1868, and no further legislation to promote immigration was enacted. The general spirit of the times was, however, favorable to immigration, and certain special reports of the Bureau of Statistics, *Labor in Europe and America* (1870), e.g., were widely disseminated with a view to encouraging immigration. About the same time the States, particularly those of the West, established boards and commissioners of immigration, charged with the duty of promoting immigration into their respective States.

It soon became evident that encouragement was no longer needed, and the tide of public opinion began to turn towards restriction. This did not at first extend beyond the idea of preventing the introduction into the country of manifestly undesirable elements—the criminal, the pauper, the insane, and the vicious. Section 1 of the Act of Aug. 3, 1882, imposed a head tax of 50 cents (increased to $1 by the Act approved Aug. 18, 1894, and to $2 by Act of March 3, 1903) on each passenger not a citizen of the United States, stipulating that the money collected shall be paid into the United States Treasury as a fund to defray the expenses of regulating immigration, of caring for immigrants, and relieving those in distress, and for the general purposes and expenses of carrying the act into effect. By Act of Feb. 20, 1907, the head tax was increased to $4. An Act of March 4, 1909, abolished the immigrant fund and ordered the covering of the receipts from the tax into the general Treasury. Since 1903 the tax has regularly produced a surplus above the cost of administration of the immigration law. In 1913 this surplus revenue amounted to nearly $2,000,000.

Section 2 provided that the Secretary of the Treasury should be charged with the duty of executing the provisions of the act, and for that purpose empowered him to enter into contracts with the officials of the several States at their several ports. By the Act of March 3, 1903, the Commissioner General of Immigration is placed under the authority of the Secretary of the Treasury, although the Immigration Bureau is subordinate to the Department of Labor.

Section 3 provided that the Secretary of the Treasury establish such rules and regulations, and issue from time to time such instructions, not inconsistent with law, as he should deem best calculated for the protection of immigrants from fraud and loss and for carrying out the provisions of the act and the immigration laws of the United States, etc.

Section 4 treated of the exclusion and deportation of specified classes. It provided that foreign convicts, except those convicted of political offenses, lunatics, idiots, or any persons not able to take care of themselves without becoming public charges, should be sent back at the expense of the owners of the vessels on which they had come.

The Act of 1882 is still in force in principle, though in minor points it was modified by a Law of March 3, 1891, of which the following section is the most important:

"That the following classes of aliens shall be excluded from admission into the United States, in accordance with the existing acts regulating immigration, other than those concerning Chinese laborers: All idiots, insane persons, paupers, or persons likely to become a public charge, persons suffering from a loathsome or a dangerous contagious disease, persons who have been convicted of a felony or other infamous crime or misdemeanor involving moral turpitude, polygamists, and also any person whose ticket or passage is paid for with the money of another, or who is assisted by others to come, unless it is affirmatively and satisfactorily shown, on special inquiry, that such person does not belong to one of the foregoing excluded classes, or to the class of contract laborers excluded by the Act of February 26, 1885; but this section shall not be held to exclude persons living in the United States from sending for a relative or a friend who is not of the excluded classes under such regulations as the Secretary of the Treasury may prescribe. *Provided*, That nothing in this act shall be construed to apply to or exclude persons convicted of a political offense, notwithstanding said political offense may be designated as a 'felony, crime, infamous crime, or misdemeanor involving moral turpitude' by the laws of the land whence he came, or by the court convicting."

The act was further amended by the Law of March 3, 1903. By this law the Bureau of Immigration is given a right to deport epileptics, persons who have been insane within the five years preceding their arrival in America, and persons who advocate the overthrow of all governments or the assassination of public officials. Deportation may take place any time within three years after arrival. For the sexually immoral classes the three-year limitation has been removed.

The joint administration of immigration affairs by Federal and State officials which had been in vogue since the passage of the Act of 1882 had not proved satisfactory, and by the Act of 1891 the entire charge of the matter was assumed by the general government. The Statute of March 3, 1893, took a step in advance of previous legislation by requiring at least a preliminary inspection of immigrants at the point of departure. Each immigrant is provided with a number identifying him to the inspectors of the United States. The medical inspection provided by the act has been a useful aid in preventing the introduction of disease. Furthermore, a fine of $100 is assessed upon any steamship company that brings to the United States an alien afflicted with a loathsome or dangerous contagious disease, tuberculosis, idiocy, imbecility, epilepsy. Under this provision $30,200 was levied in fines in 1913.

Side by side with legislation to exclude persons morally and physically undesirable has gone the effort to exclude the contract laborer. The first law on this subject was passed Feb. 26, 1885. It made it unlawful for any person, company, partnership, or corporation in any manner whatsoever to prepay the transportation or in any way assist or encourage the importation or migration of any alien or foreigner into the United States, under contract or agreement or parole, special, expressed, or implied, made previous to the importation of such alien or foreigner to perform labor or service of any kind in the United States. The law excepted strictly personal and domestic servants from its provisions.

The object of this legislation was to prevent the agents of manufacturers from contracting in Europe with the laborers, oftentimes in herds, for the purpose of breaking strikes or introducing a supposedly more docile, because more ignorant, class of laborers. Moreover, it is plain that contracts made abroad would be made with reference to the scale of wages existing in foreign countries rather than those in force here and would thus introduce a lower-priced competition, dangerous to the well-being of the working classes. The general spirit of the law has been commended by public opinion, though in its first form it presented some crudities which placed it in a ridiculous light, as where a clergyman was denied admission to the United States by reason of a contract made in England to assume charge of a parish in New York. Subsequent modifications distinctly eliminating the professional classes and bringing the operation of the law within the intention of the legislators have much improved the statute.

The general characteristic of the United States immigration laws is that whoever enters in violation of the law is to be returned to the point of departure at the expense of the steamship company which brought him, and that this liability extends in all cases for a period of one year after arrival. The machinery for the enforcement of the law has been progressively improved. The following table will indicate the extent to which the practice of exclusion has been employed, and on what grounds, in recent years. It is to be borne in mind that the principal effect of the law is to compel a fairly minute examination, by the transportation companies, of intending immigrants.

CAUSE OF REJECTION	1907	1908	1909	1910	1911	1912	1913
Idiots	29	20	18	16	12	10	18
Imbeciles	....	45	42	40	26	44	54
Feeble-minded persons	....	121	121	125	126	110	483
Insanity (including epileptics)	189	184	167	198	144	133	198
Likely to become a public charge (including paupers and beggars)	6,866	3,741	4,458	15,927	12,048	8,182	7,956
Afflicted with contagious diseases	3,822	2,847	2,308	3,033	2,735	1,674	2,457
Afflicted with tuberculosis	....	59	82	95	111	74	107
Physically or mentally defective	....	870	370	312	3,055	2,288	4,208
Criminals	341	136	273	580	644	592	808
Prostitutes and other immoral aliens	18	124	323	316	253	263	367
Procurers of prostitutes	1	43	181	179	141	192	253
Contract laborers	1,434	1,932	1,172	1,786	1,336	1,333	1,624

One of the great difficulties in the way of the thorough administration of the law is the comparative ease with which persons of the undesirable classes obtain access to the United States through Canada. Arrangements have been made between the Canadian government and the immigration service establishing an inspection in Canada. The effort is made to inspect not only the immigrants who give the United States as their destination, though arriving at Canadian ports, but also those who give Canada as their destination, but come into the United States. The fact that, of less than 5000 persons of the latter class inspected, 2000 were turned back, indicates clearly that the ineligible classes have been coming into the United States over the Canadian border.

The present immigration laws represent little more than sanitary measures designed to protect society from the introduction of positively vicious and undesirable elements. The demand has been heard, and has been supported by a wealth of argument, that the United States should be more liberal in its interpretation of the word "undesirable," and exclude also such immigrants as by reason of incapacity and ignorance give the least promise of assimilation.

The question of still further restricting immigration made its appearance in the early nineties. It was felt that many persons were admitted into the United States who were not desirable acquisitions to its population. The demand was heard in many quarters that the illiterate should be excluded, and the question was actively agitated in Congress until 1897. In that year a bill passed both Houses of Congress which excluded from admission to the United States all foreign persons over 16 years of age who could not read or write the English or some other language, except parents or grandparents accompanying persons otherwise qualified, or coming to join relatives already in the United States. The bill was vetoed in the closing hours of Congress, March 3, 1897, by President Cleveland, on grounds of general policy, as well as for material defects in the measure, such as the exclusion of the illiterate wives of qualified persons. The bill was reconsidered in the House of Representatives and passed over the President's veto by the constitutional majority of two-thirds; but no attempt was made to force a vote in the Senate. In 1906 a measure excluding immigrants unable to read or write English and increasing the head tax was debated in Congress, but as amended merely provided a bureau of immigration and naturalization, whose duty it is to keep a registry of all aliens entering the United States. The Immigration Commission in its recommendations, published in 1911, strongly urged limitation of immigration and favored a literacy test among the measures that would have a restricting tendency. A measure limiting the immigration of illiterates to certain specified classes was passed by both Houses of Congress in 1912, but was vetoed by President Taft. A similar measure was vetoed by President Wilson in 1915. A new principle of restriction was proposed by the Immigration Commission: the limitation of immigrants from a specific country to a definite percentage of the immigrants from that country already in the United States. This proposal was embodied in the Dillingham Immigration Bill, introduced in Congress in 1910. It was proposed to restrict immigration from each country to 10 per cent of those born in that country and resident in the United States.

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IMMIGRATION, Changes in Bodily Form of Descendants of Immigrants. The Immigration Commission of the United States appointed Professor Franz Boas, New York City, to conduct an investigation of the modifications undergone by the descendants of immigrants residing in New York City. The results of this study were announced in 1911, from which it appears that among other changes the children of Europeans show a tendency to change their head form. Thus, according to the cephalic index (see Index, Cephalic), Sicilians born in Sicily are rated at 78, while Sicilians born in New York are rated at 80; and again European-born Jews at 83 as against 81 for the New York born. Similar changes were found among other immigrants. (For tables of measurements, consult *Report of the Immigration Commission*, Washington, 1911.) It is claimed that these changes are entirely due to the geographical or other environment, and that on the whole the differences tend towards a medium index of 80, suggesting that the American environment may be forming a distinct type by changing the anatomy of its inhabitants. To this interpretation many authorities object, but the fact remains that a difference has been demonstrated between the foreign born and the native born. To determine the true significance of these differences, further investigation will be necessary.

IMMISCH, Im'ish, Otto (1862–). A German classical scholar, born at Wartha, Lusatia. He was educated at the University of Leipzig, where he became lecturer in 1889 and was professor from 1896 to 1907. After six years at Giessen, in 1913 he became professor at the University of Königsberg. He wrote much for philological journals, and among his separately published works the more important are: *Philologische Studien zu Plato* (1896; 1903); *Die innere Entwicklung des griechischen Epos* (1904); a revision of Susemihl's *Aristotelis Politica* (1909); *Wie studiert man klassische Philologie?* (1909); *Das Erbe des Alten* (1911).

IM'MOLA'TION (Lat. *immolatio*, from *immolare*, to sacrifice, from *in*, in + *mola*, grindstone, meal, from *molere*, to grind; connected with Goth., AS., OHG. *malan*, Icel. *mala*, Ger. *mahlen*, to grind, Eng. *meal*). A Roman sacrificial ceremony in which the victim was sprinkled with meal coarsely ground and mixed with salt (called *mola salsa*). Hence, to immolate means to sacrifice.

IM'MORAL'ITY (from Lat. *in-*, not + *moralis*, moral, from *mos*, custom, right). In its broadest sense, any breach of the duty which one owes to God, to his fellowmen, or to himself; in a narrower, popular sense, an act or course of conduct which strongly violates the sense of decency of the community, especially offenses of a sexual character.

Immorality, as such, is generally not punished by law, but is left to be dealt with by the informal agencies of social control or by the ecclesiastical authorities. It is only when an immoral act or course of conduct is so harmful to others than the wrongdoer, or is so repugnant to the sense of decency and morality of the community as to excite general indignation, that its control and punishment are taken over by the law. As the foundation of criminal jurisprudence is the duty and necessity which rests upon the authorities of preserving the peace, the class of immoral acts first recognized as proper subjects for legal recognition are crimes of violence, and then, at a later stage, any other acts leading to breaches of the peace. Acts of private immorality, i.e., such as do not directly affect any others than the participants therein, as drunkenness, gambling, fornication, and the like, have not generally, except under an ecclesiastical dispensation, been noticed by the law, except in cases where they were committed publicly so as to constitute them a public nuisance.

But though the law may tolerate immorality, certain classes of immoral acts may yet incur indirectly the condemnation of the law, as by denying to the person who has been guilty of them his right to enforce a claim upon a contract or a tort arising out of such an act. Thus, a bond given for an immoral consideration, or to secure the performance of an immoral act, is unenforceable. However, a completed transfer of property, real or personal, is none the less valid and binding because based on an immoral consideration. Immorality which does not fall under the ban of municipal law rarely, if ever, affects the legal rights or status of a person. It may subject him to social censure, but it does not defeat him in the prosecution of a legal claim. Cf. MALUM IN SE.

The present tendency, both in Europe and in the United States, seems to be to extend the control of the law over the private lives of persons and more and more to make acts of immorality subject to legal penalties. See ADULTERY; FORNICATION; DRUNKENNESS; GAMBLING.

IM'MORTAL'ITY (Lat. *immortalitas*, from *immortalis*, undying, from *in-*, not + *mortalis*, mortal, from *mors*, death; connected with Skt. *mar*, to die, Gk. *μόρος*, *moros*, death, and *βροτός*, *brotos*, mortal, Lith. *mirti*, to die, OChurch Slav. *mrŭtvŭ*, dead, OHG. *mord*, Ger. *Mord*, murder, AS. *morþ*, death). The endless existence of the human soul in the continued possession of its distinct personality and consciousness. How early the idea of a survival after death entered the mind of man cannot be determined. Some evidence has been recently forthcoming of such a disposal of the dead already in the later periods of the Paleolithic age as would seem to indicate at least a tendency of thought in this direction; and when the marvelous artistic development of the Magdalenian period is considered, revealing as it does a comparatively advanced religious speculation, this interpretation of certain apparent mortuary customs is by no means improbable. In the Neolithic age not only the ornaments, weapons, tools, and food placed by the side of the dead, but the houses, mounds, chulpas, and tombs built for them, testify to a belief that some of the dead for some time continue some kind of an existence after death. It is probable that at first death was looked upon as a deep and prolonged sleep. The dead was left in his dwelling place, the survivors seeking a new home, or a special structure was made for him. Visions of the departed in dreams naturally led to the conclusion that they left their dwellings in the night, and, upon further reflection, to the theory of a double of finer material, but dependent upon the food and drink brought to the tomb. The practices of the Neolithic age already imply the development of some such theory of a "soul." The fact that these customs and the faith they imply survived into the more advanced civilizations of antiquity and are to be found extensively at the present time among peoples that have remained upon lower stages of development, indicates for them a very high age.

Tombs were the earliest temples, and the ancestral cult was the earliest form of divine worship. As long as offerings were made to the dead the departed ancestors were believed to exist and to protect their descendants. Thus the cult itself tended to create a confidence in an indefinite prolongation of existence in the case of the objects of filial worship. As the great cosmic forces began to attract more attention, the double of the dead might be connected with them in one way or another and thereby become more independent of the tomb. But even where, as in Egypt, this process can be most clearly perceived, the ancestral cult as the basis of hope for survival maintained itself to the latest times. Whether the mass of men in Egypt who were too poor to pay the cost of embalming and "a house for eternity" were regarded as long surviving the shock of death, is doubtful. But the assurance in a future life, as rich as the present and not very different in its outward conditions, for those properly embalmed and entombed, was very strong. Numerous pictorial representations and inscriptions in tombs and papyri from different periods show how intensely the inhabitants of the Nile valley believed in a life after death.

Starting from the same premises, speculation as to the future took a different turn in India. The doctrine of metempsychosis was developed. Without losing its identity the spiritual substance in man was supposed to enter into other forms of life, rising or sinking in the scale of being in consequence of the deeds wrought in the body and the character formed. (See ESCHATOLOGY.) This transmigration of souls implied eternal existence before as well as after any appearance in the world as a human being. It precluded the idea of a disembodied spirit, and it adjusted outward circumstance to inner character, punishment to crime, and reward to virtue more nicely than any other system of thought. But this assurance of eternal life became itself a burden to the mind of man, and it cried out for deliverance from the endlessly turning wheel of existence. Buddhism offered relief in the hope of Nirvana. In Persia Mazdaism proclaimed, possibly not in the Gathic period, but at least as early as the fifth century B.C., the doctrine of a resurrection (q.v.). This doctrine was no doubt based upon the simpler and more widespread belief that the sleepers in the dust might be aroused. Cases of apparent death and successful resuscitation would strengthen this expectation. The animistic basis is quite evident.

Among the Iranian peoples of the northwest, the Sarmatians, the Scythians, and the Thracians, the faith in a future life was very strong. From Thrace the Orphic cult spread in the Greek world. While the Mycenæan tombs, as compared with the remains of the preceding age, reveal a growing importance attached to the life beyond, but no conceptions differing from those generally associated with the ancestral cult, and the Homeric poems tell of Elysian fields as well as of a barren and cheerless Hades, but put no emphasis upon what still is a somewhat shadowy existence beyond with no moral distinctions, the Orphic cult societies offered to the initiated the hope of a blessed immortality. (See ESCHATOLOGY; HEAVEN; HELL.) The arguments of Socrates and Plato are far from being the first intimations of immortality among the Greeks. They are not endeavors to open new vistas into a life beyond. On the contrary, they represent a critical tendency seeking to establish the truth of a view held by many, and to find the rational grounds on which it can be maintained, if at all. In the following periods skepticism prevailed in some circles, ardent belief in others. If the practical character of the Roman caused him to cling to the ancestral cult, his hospitality to religious ideas opened the doors to the doctrines taught by the Orphic and Dionysiac societies. It was a real life of battle and of joy to which the Teutonic warriors looked forward in Odin's hall, Valhalla.

Among the Semitic nations the prevailing view left little joy in the thought of man's fate after death. The Babylonians and Assyrians seem to have believed in a semiconscious later existence, but with no distinctions based on character or conduct and no feature rendering it desirable. The myth of Ishtar's descent to the nether world shows that imagination occupied itself with the abode of the dead, and the translation of some heroes to be with the gods tends to mark the contrast with the ordinary issues of human life. Substantially the same conception of the future was held by the ancient Hebrews. (See SHEOL; HADES.) There was no conception of an endless existence of the human soul in possession of a distinct consciousness, and no intimation of a difference based on conduct in this life. A poetic passage (Isa. xiv) possibly shows that the kings were thought of as sitting upon thrones—consequently a social distinction. The intense religious life of the nation did not occupy itself much with the future of the individual. Neither the prophets, nor the legislators, nor the poets, nor the great wisdom teachers, seem to have attached much importance to it. Their opposition to the ancestral cult and to necromancy may account in a measure for this indifference. Only as the sufferings of innocent individuals, particularly in the Exile, made the question of the divine government of the world acute, did "the hope of man" receive attention by the thinkers of Israel. But the author of Job presents this possibility of a restoration to life only in order to reject it. He is not willing to obscure the issues by the introduction of what he considers a vain and improbable speculation. A high type of piety thus flourished without a hope of immortality. But the growing demand for a justification of the ways of God was met by foreign conceptions that brought relief by a temporary postponement of the problem. Persia contributed the thought of a resurrection, Greece that of immortality in the stricter sense. The conception of a resurrection appears for the first time in Jewish literature in the last chapter of the Book of Daniel (written in 165 B.C.). Here some of the dead are raised, probably the martyrs of the great persecution and their oppressors, to continue their life on earth.

There is evidence that this new life was sometimes regarded as of limited duration. In regard to the new body, some maintained that it was identical with the old, or of a similar substance; others that it was spiritual; some that it was bestowed on men at a general resurrection in the future; others that it was given immediately after death. In some circles it was thought that only the Israelites or the good would be raised; in others, that all men, even the wicked, would rise. (See RESURRECTION.) The new doctrine was chiefly accepted by the Pharisees; the Sadducees strongly opposed it. Ecclesiastes rejected the idea of a survival after death in every form. Meanwhile the Greek conception of immortality based on the nature of the soul, with or without the notion of preexistence, found acceptance not only among the Alexandrian Jews but to some extent also in Palestine. A doctrine of a future life in which the resurrection had no place is found in the Slavonic Enoch (see ENOCH, BOOKS OF), Wisdom of Solomon, Philo, among the Essenes, and elsewhere. Jesus himself seems to have believed in a spiritual resurrection occurring immediately after death. A somewhat similar conception is found in the Pauline literature, while the Fourth Gospel presents the eternal life as a sharing in the divine nature that may begin in time and continue through eternity, and seems to use the term "resurrection" figuratively. The firm conviction of the early Church that Jesus had risen from the nether world and ascended to heaven, and that He would presently return in glory to raise the dead and establish His kingdom on earth, tended to base the hope of survival upon His resurrection.

In 1 Corinthians xv the thought is expressed that if Jesus was not risen His disciples are not raised, and that it does not matter how life is lived if that is the case. It was felt that through His resurrection He had thrown light upon life and immortality. Much of the success of Christianity was no doubt due to the prospect that it held out for a future life. It offered to all men, even slaves and barbarians not permitted to participate in the official cult and not invited to take the holy vows of the secret cult societies, the same blessed immortality that was promised to those initiated in the Orphic, Dionysiac, and Mithraic mysteries, and it was itself influenced by the thoughts that had prevailed in these religious societies. (See HEAVEN; HELL.) The Greek idea that the soul is immortal by virtue of its own nature became dominant in Christian theology. The controversies within the Church have not affected this fundamental position, but have had reference to the character of the future life.

Through Maimonides the Greek conception of immortality found its way into the synagogue. At first it had a tendency to exclude the doctrine of a resurrection; subsequently it was made the philosophical basis of this doctrine, as in the Church. With the renascence of learning and the development of natural science doubts as to the immortality of the soul began to be expressed. Uriel Acosta (q.v.) was persecuted for rejecting this doctrine, and he had sympathizers among the deists. The growth of evolutionary philosophy in the nineteenth century led many minds to question the survival of the human soul after death, and the possibility of a continued life of the spirit apart from the bodily organism is to-day widely denied in scientific circles. Various reasons are given for this negative position. It is maintained that the mental life of man is so closely connected with and invariably dependent upon the brain that a continuance of any intellectual functions after the dissolution of the body is inconceivable. As the mentality of man appears to differ from that of the animal only in degree, and not in kind, any argument from the peculiarities of the human mind is held to imply also the immortality of the lower organisms.

Still greater difficulties are thought to arise from man's embryological development. The lack of any convincing evidence of communication between the dead and the living is pointed out, and it is urged that the origin of the belief can be naturally accounted for, and that its persistence is largely due to the social conditions in which man is placed. On the other hand, the doctrine is defended not only from the standpoint of belief in an infallible revelation, but also by thinkers who claim the right of free inquiry and base their views solely upon what appears to them to be sufficient evidence. As a more careful exegesis renders it increasingly difficult to appeal to the Old Testament on that subject, it is generally the New Testament, and particularly the words ascribed to Jesus Himself, that furnish the authority. Even from an independent point of view, great weight is often accorded to the conception of Jesus and the New Testament writers, on the ground of the deeper intuition into religious truth possessed by them. The uncertainty, however, as to the actual words of Jesus and the growing impression that some at least of the writers of the New Testament did not believe in a natural immortality, but in an endless life bestowed as a free gift of God upon His children in an especial sense, have led many scholars who attach much importance to these spiritual authorities to accept the theory of a conditional immortality. The good, in their opinion, will continue to exist; the wicked are destined for final annihilation.

Where the question of man's survival is decided in the affirmative without an appeal to authority, the reasons given are such as the inadequacy of the objections, the difficulty of accounting for certain phenomena except as manifestations of spirits, the incompleteness of the present life, and the "intimations of immortality" to which it is felt that an objective reality must correspond. Facts are quoted that tend to show the independence of man's mind operating with great clearness, precision, and strength even in wholly abnormal physical conditions; and though, to render the argument strictly cogent, it would be necessary to prove that in these instances the brain was also affected, and that the mental power would not have been enhanced if the physical conditions had been more normal, importance seems to be rightly attached to this consideration. That the relation between mental activities and cerebral changes is very intimate is not denied; but it is thought that a distinct and separable spirit using the brain as its organ might act upon it in such a manner as to express different perceptions through different cerebral centres. The argument based on the evolution of mental life in animal and man, and the transmission of psychical as well as physical characteristics from man to man, is met by the observation that the consciousness of self, whatever its origin, is so distinguishing a mark of human nature and so intrinsically significant that a greater permanence and a loftier destiny may well be associated with it. Instead of making self-consciousness the basis of immortality, others prefer to think of the possession of a sense of right or a peculiarly high development of the moral nature as furnishing the ground for survival.

A mass of testimony is produced, ancient and modern, to show actual communication between the dead and the living. Much of this testimony comes from persons bereaved of some relative or friend whose potent personality still occupies the mind. In almost all instances the initiative is taken by the living, and the communication is mediated through a third person. A critical sifting is often impossible. Where the manifestations through a medium have been watched and studied by scientifically trained observers, there is at best only a small residue of facts that cannot be accounted for by known laws of nature. In the present state of our knowledge of psychical phenomena it is sometimes hazardous to pronounce a judgment. The scientist is, as a rule, inclined to assume the operation of some law of nature not yet fully understood. The manifestations may thus furnish to our minds a presumption in favor of immortality, but they cannot prove it. With more effect an argument is founded upon the incompleteness of the present life. The largest part of the human race die in infancy, or before years of discretion have been reached, and it is natural to ask whether there is no outflowering elsewhere of the human life that only buds here. Even the longest lifetime raises more intellectual problems than it solves, and leaves the mind curiously looking for their solutions to the last. The moral imperfections, seen even in the best, painfully apparent in the masses of men, give the impression of something fragmentary, unfinished, partially realized. The inequalities of life as regards wealth, position, health, opportunity for self-realization, and the still more marked inequalities of character, seem to call for a readjustment, for compensations in another life. If these considerations strictly prove only a dissatisfaction with prevailing conditions, and would to some extent lose their validity as arguments in a state of society better organized, more intelligent, resourceful, and strong than the present, the shrinking from even a painless death, the sense of an inalienable personality, and the long and widespread prevalence of the hope of a future life are deemed by many to have evidential value. The fear of death may indeed be a dread of extinction, and the fear of something after death the involuntary reflection of a belief long cherished by mankind. But it is forcefully argued that a belief so strong and persistent is not likely to be a sheer delusion.

While manifestly it is not safe to conclude from the intensity and popularity of an idea that there must be an objective reality corresponding to it, and while it is especially to be considered that modern science has revolutionized that estimate of the universe, held throughout the ages, with which all eschatological speculations in antiquity were closely connected, it nevertheless seems plausible that some fact in nature's economy is reflected in the hope of immortality. That the elements composing man's body at death are imperishable and will forever continue to be integral parts of forms that manifest the eternal energy, is reasonably certain. That his psychical peculiarities survive in his offspring and in the human lives that directly or indirectly come into contact with him, is a matter of easy observation. Whether this survival in the race is endless seems to some thinkers doubtful, on the ground that the earth itself will some day have run its course and ceased to be the bearer through space of organic life. But as it is quite inconceivable that in an infinite universe, constituted, as spectral analysis shows, of essentially the same substances, a single satellite of a single sun should have produced intelligence like that of man, the secret of the earth's life may become known, and the influence of the human race, large or small, good or bad, may be felt elsewhere in the universe ere the final catastrophe comes, and even out of the death of this planet are likely to rise new forms of life.

That man will live forever in other forms of physical organization and of consciousness may therefore be regarded as exceedingly probable. Whether the consciousness of personal identity which cannot be stripped off or dissolved in the succession of fluctuating mental states and the accompanying sense of moral accountability can be fully explained as products of the brain due to the persistency of the physical type, in spite of incessant changes in the organism, may be gravely questioned. From the standpoint of idealistic philosophy this consciousness of self is interpreted as betokening the presence of a spiritual monad reflected to human sense perception only as though it possessed a material form. But even if the ultimate reality is conceived of as an infinite, eternal, and inexhaustible energy, it does not seem to follow that each or any of its individualized expressions shares its everlasting persistence. Rather would it seem as if the reality that no longer is shadowed forth to our sense in the outward form of a man must have ceased to be what it was. The idea of a conditional immortality has received some additional strength from the doctrine of a survival of the fittest. It encounters great difficulties, however, in attempting to define what constitutes fitness. The difference between a short life on earth and an endless existence is so infinitely great that the mind shrinks from ascribing the power to determine so momentous a fate to any conviction that has been formed, or disposition that has been developed, or line of conduct that had been adhered to, during a few years of earthly life, especially in view of the enormous influence of heredity and environment. If therefore scientific inquiry apparently leads to a *non liquet*, and assurance based on authority can be preserved only until the authority itself is questioned, it is the more gratifying to note the important place the doctrine of immortality has had in the education of the human race in enhancing the worth of the individual and emphasizing his higher spiritual interests, in maintaining his confidence in the inherent rightness of the universe, and in training him to regulate his present conduct by considerations of the future.

In Occidental philosophy the question of immortality has been discussed with great vigor and interest since the time of Socrates; but in this article it will be possible to give only a few typical quotations from modern philosophers, to show how varying have been the reasons given for the affirmative answer to the question. Kant's treatment of the subject is famous; after criticizing the rationalistic position on the subject, according to which immortality can be proved from the simplicity of the soul, Kant makes of immortality not a demonstrable doctrine but a moral postulate. "The realization of the *summum bonum* in the world is the necessary object of a will determinable by the moral law. But in this will the *perfect accordance* of the mind with the moral law is the supreme condition of the *summum bonum*. This then must be possible, as well as its object, since it is contained in the command to promote the latter. Now, the perfect accordance of the will with the moral law is *holiness*, a perfection of which no rational being of the sensible world is capable at any moment of his existence. Since, nevertheless, it is required as practically necessary, it can only be found in a progress *in infinitum* towards that perfect accordance, and on the principles of pure practical reason it is necessary to assume such a practical progress as the real object of our will. Now, this endless progress is only possible on the supposition of an *endless* duration of the existence and personality of the same rational being (which is called the immortality of the soul). The *summum bonum*, then, practically is only possible on the supposition of the immortality of the soul; consequently this immortality, being inseparably connected with the moral law, is a postulate of practical reason (by which I mean a *theoretical* proposition, not demonstrable as such, but which is an inseparable result of an unconditional *a priori practical* law)." (*Kritik of Practical Reason*, pp. 262–263; Abbott's translation.) Some followers of Kant have on Kantian principles attempted to go further than their master and to *demonstrate* immortality. Thus, Professor Howison, taking the Kantian thesis that time is not objectively real, but "an expression of each mind's spontaneous activity," establishes upon this the "eternity of the individual spirit in the only ultimate meaning of eternity; since, as the ground and source of Time itself, the being of the soul must transcend Time, though including Time, and consequently, while involving everlastingness, must have its *full* meaning in just that spontaneous sourcefulness of self-consciousness from which everlastingness arises." Thus the "sourceful and directive power of our individuality" involves, "first, the essential supremacy of the soul over death, and then its intrinsic imperishableness from any cause." (*Limits of Evolution*, pp. 303 ff.) This, as is seen, is a carrying out of Kant's principles to a multipersonalistic issue. Royce, taking the position of absolute and monistic idealism, has his own way of proving immortality. According to his absolute idealism every individual finite experience is a fragment of the eternal and absolute experience, which he calls God. Now, "in three ways, our union with God implies an immortal and individual life. For first, in God, we are real individuals, and really conscious Selves—a fact which neither human thought nor human experience, nor yet any aspect of our present form of consciousness, can make present and obvious to our consciousness, as now it is. But since this very fact of our eternal and individual Selfhood is real as a conscious fact, in God, we too, in him, are conscious of our individuality in a form higher than that now accessible to us. And secondly, the death of an individual is a possible fact, in an idealistic world, only in case such death occurs as an incident in the life of a larger individual, whose existence as this Self and no other, in its individual contrast with the rest of the world, is continuous in meaning with the individuality that death cuts short. No Self, then, can end until itself consciously declares, 'My work is done, here I cease.' But, thirdly, no ethical self, in its union with God, can ever view its task as accomplished, or its work as done, or its individuality as ceasing to seek, in God, a temporal future. In Eternity all is done, and we too rest from our labors. In Time there is no end to the individual ethical task." (*The World and the Individual*, vol. ii, p. 445.) In this a very strong echo of Kant is detected. James does not attempt to prove immortality, but to make it tenable as a working hypothesis. In his view the main argument against immortality is the fact that thought is a function of the brain. "When the physiologist who thinks that his science cuts off all hope of immortality pronounces the phrase, 'Thought is a function of the brain,' he thinks of the matter just as he thinks when he says, 'Steam is a function of the teakettle,' 'Light is a function of the electric circuit,' 'Power is a function of the moving waterfall.' In these latter cases the several material objects have the function of inwardly creating or engendering their effects, and their function must be called *productive* function. . . . But in the world of physical nature productive function of this sort is not the only kind of function with which we are familiar. We have also releasing or permissive function, and we have transmissive function. The trigger of a crossbow has a releasing function: it removes the obstacle that holds the string, and lets the bow fly back to its natural shape. . . . In the case of a colored glass, a prism, or a refracting lens, we have transmissive function. The energy of the light, no matter how produced, is by the glass sifted and limited in color. . . . My thesis now is this: that, when we think of the law that thought is a function of the brain, we are not required to think of productive function only; *we are entitled also to consider permissive or transmissive function.*" Suppose that behind the veil of material things there lies "one infinite Thought," and that "our brains are thin and half-transparent places in the veil. What will happen? Why, the life of souls as it is in its fullness will break through our several brains into this world in all sorts of restricted forms, and with all the imperfections and queernesses that characterize our finite individualities here below. . . . And when finally a brain stops acting altogether, or decays, that special stream of consciousness which it subserved will vanish entirely from this natural world. But the sphere of being that supplied the consciousness would still be intact; and in that more real world with which, even whilst here, it was continuous, the consciousness might, in ways unknown to us, continue still." (*Human Immortality*, pp. 12 ff.) Bergson rests his belief in immortality on his view that one of the essential functions of consciousness is "to accumulate and preserve the past, that very probably . . . the brain is an instrument of forgetfulness as much as one of remembrance, and that in pure consciousness nothing of the past is lost, the whole life of a conscious personality being an indivisible continuity"; are we not by this led to suppose "that the effort continues *beyond*, and that in this passage of consciousness through matter (the passage which at the tunnel's exit gives distinct personalities) consciousness is tempered like steel, and tests itself by clearly constituting personalities and preparing them, by the very effort which each of them is called upon to make, for a higher form of existence? If we admit that with man consciousness has finally left the tunnel, that everywhere else consciousness has remained imprisoned, that every other species corresponds to the arrest of something which in man, succeeded in overcoming resistance and in expanding almost freely, thus displaying itself in true personalities capable of remembering all and willing all and controlling their past and their future, we shall have no repugnance in admitting that in man, though perhaps in man alone, consciousness pursues its path beyond this earthly life. This is as much as to say that, in my opinion, the aspirations of our moral nature are not in the least contradicted by positive science." (*Hibbert Journal*, vol. x, p. 43.) The philosophers thus quoted all believe more or less assuredly in a future life, but many philosophers are either agnostic or disbelievers. But explicit disavowal of any hope of immortality is rather rare. James says: "I confess that my surprise was great when I came to look into books for a passage explicitly denying immortality on physiological grounds, . . . I was unable to find anything blunt and distinct enough to serve. I looked through all the books that would naturally suggest themselves, with no effect; and I vainly asked various psychological colleagues. And yet I should almost have been ready to take oath that I had read several such passages of the most categoric sort within the last decade. Very likely this is a false impression, and it may be with this opinion as with many others. The atmosphere is full of them; many a writer's pages logically presuppose and involve them; yet, if you wish to refer a student to an express and radical statement that he may employ as a text to comment on, you find almost nothing that will do." The most explicit passage he could find after all this search is the following: "Not only consciousness, but every stirring of life, depends on functions that go out like a flame when nourishment is cut off. . . . The phenomena of consciousness correspond, element for element, to the operations of special parts of the brain. . . . This fundamental proposition . . . carries with it the denial of the immortality of the soul." (Dühring, *Der Wert des Lebens*, 3d ed., pp. 48, 168.) As a good example of the agnostic position, we find Lotze's saying: "The question of the immortality of the soul does not belong to Metaphysic. We have no other principle for deciding it beyond this general idealistic conviction: every created thing will continue if and so long as its continuance belongs to the meaning of the world; every one will pass away whose actuality had only in some transitory phase of the world's course a place that justified it." (*Metaphysic*, § 245.)

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IMMORTALITY, CONDITIONAL. See ANNIHILATIONISM.

IMMORTEL, ĕ'môr'tĕl', L'. A romance by Alphonse Daudet (1888), picturing with keen insight and irony the intrigues and petty strivings of the academic world.

IMMORTELLE, ĭm'ŏr-tĕl' (Fr., fem. sing. of *immortel*, immortal). A name applied to various species of *Helichrysum*, especially *Helichrysum arenarium* and *Helichrysum orientale*, which are grown extensively in France, where the flowers are made into compact wreaths for home use or for export. They are chiefly used as mortuary decorations, either in their natural color (yellow) or bleached white. Like other flowers, such as tuberoses and callas, that have been used largely for funereal decoration, immortelles have suffered in popularity, especially since the barbarous practice of dyeing them purple and vermilion, and working them into fantastic designs, came into vogue. The most striking feature of the immortelle is the one that suggested the name; the flowers, being dry and firm, are so-called "everlasting." They retain their natural colors for months or even years. See AMARANTH.

IMMU'NITY (from Lat. *immunitas*, exemption, from *immunis*, exempt, from *in-*, not + *munis*, serving, from *munus*, duty). Immunity may be described as the state or condition of an individual who is resistant or nonsusceptible to a particular infection. There is no such thing as absolute immunity. While animals or individuals may seem under natural conditions to be immune to certain diseases, yet when they are placed in an unfavorable environment, or when the natural vigor is lowered by climate or insufficient food, they become susceptible to diseases to which they are ordinarily immune. There is a great difference in the resistance shown to the invasion by germs of disease by certain animals of allied nature. Human beings, cattle, and guinea pigs show great susceptibility to tuberculosis, while the cat, dog, and horse resist it. Man easily becames a victim of typhoid fever, while domestic animals never suffer from it. It has long been a matter of observation that an attack of certain infections, such as smallpox, measles, typhoid fever, cholera, typhus fever, leads to immunity, while attacks of others not only fail to confer immunity but leave the individual more susceptible than before. Among these latter are pneumonia, erysipelas, influenza, diphtheria, dysentery, tonsillitis, and acne. This phenomenon is explained on the theory of hypersusceptibility or anaphylaxis (q.v.). Immunity is either (1) *natural* or (2) *acquired*. Natural immunity is a congenital insensitiveness to infection or contagion which is possessed by certain individuals, families, or species, or which exists as a racial characteristic. The same individual may be immune against a certain disease at one age and become susceptible to it at another age; thus, infants are almost entirely immune against yellow fever, and but few cases occur among them. The Arab is said to be absolutely immune to typhoid fever, and the Japanese to scarlet fever. *Acquired immunity* is a condition of insusceptibility which results from passing through an attack of the disease, or from being inoculated with the poison of the disease, which results in a change in the blood. Immunity to yellow fever results after one attack of the disease. One attack of typhoid fever is almost a certain guard against another—a statement which is true also of scarlet fever and measles. *Active immunity* may be produced by the injection of cultures of living or dead bacteria, or their toxins, into an animal. Passive immunity is brought about by the injection of antitoxic serums. That is to say, the immunity conferred by a vaccine is an active resistance, while that conferred, e.g., by diphtheria antitoxin is a passive immunity. *Experimental immunity* results from introducing, for experimental purposes, attenuated microörganisms into susceptible animals, and thereby causing the production of immunity to virulent forms of those organisms. The house mouse and the white mouse, naturally very susceptible to anthrax, are rendered immune to this disease by receiving an inoculation of blood from a convalescent tetanic animal.

Immunity is lost or destroyed in a number of ways. It may be destroyed by (1) variation from the normal temperature. Pasteur found that chickens, naturally immune to anthrax, become susceptible to the disease after being plunged into a cold bath. (2) Altering the chemical composition of the blood by changing the diet or by injection of drugs. (3) Loss of strength, or exhaustion, is a cause of loss of immunity, as Roget demonstrated by inoculating previously immune white rats with anthrax, after compelling them to work at revolving a wheel. (4) Removal of the spleen is followed by susceptibility to disease. (Bardach.) (5) Combining various microörganisms destroys immunity in some experimental cases.

Theories of Immunity. The exact causes of the phenomena of immunity are not well understood, but various theories have been proposed which make them more or less intelligible. In 1880 Pasteur taught that the microorganism, by its growth in the body, uses up some substances necessary for its existence and then perishes. If the removal of this substance be complete, perfect immunity results. This is the *exhaustion theory*. Sternberg combats it, saying that if it were true we must have in each of our bodies certain smallpox material, measles material, and scarlet-fever material, etc., each of which must be exhausted by its appropriate microörganism, thus necessitating an almost inconceivably complex body chemistry. The *retention theory* was advanced in 1880 by Chauveau, who suggested that the growth of the bacteria in the body probably originated some substance prejudicial to their further development. The *phagocytosis theory* was suggested by Carl Roser in 1881, received attention from Sternberg, and also from Koch, but was not advanced with any insistence until, in 1884, Metchnikov enthusiastically championed it and gave it his name. There are two varieties of the white blood corpuscle whose duty it is to destroy bacteria; these are the large, unicellular leucocyte, or macrophagocyte, and the smaller forms, the polynuclear leucocyte, or microphagocyte. Both these forms exhibit amœboid movements and possess the attractive force called chemotaxis, which exists between amœboid cells and food particles. Phagocytosis is the incorporation of foreign particles by these amœboid white blood corpuscles. Leucocytes actually take up and envelop living pathogenic organisms, as demonstrated by Koch in 1878. The activities of the phagocytes have been shown, by Wright and Douglas, to have their effects furthered by certain substances in the blood called opsonins (from Lat. *opsonare*, to cater to). These substances have the power of acting on invading bacteria, so that the latter are prepared for phagocytosis. The *humoral theory*, suggested by Grohmann in 1884, was advanced by Buchner, who claimed that not phagocytosis, but the bactericidal action of blood plasma, is the cause of the destruction of pathogenic bacteria. He showed that freshly drained blood, blood plasma, as well as aqueous humor, destroyed such organisms. It was shown in rebuttal that dispersion in a large amount of watery fluid causes the death of microörganisms, which grow well when allowed in a close colony. The prevalent and generally adopted theory is the *antitoxin theory*, defended by Behring and Kitasato, Brieger, Tizzoni, Cattani, Roux, Villard, and others. According to this theory, the metabolism of bacteria during disease gives rise, in the blood of the sick person, not only to poisonous alkaloids called toxins (existing either in the bodies of the bacteria or produced by them), but also to defensive proteids called antitoxins, which possess the property of neutralizing the toxins. Hankin divides the antitoxins (formerly called *alexins* by Buchner) into four groups. Proteid substances that occur naturally in animals and possess the power of destroying bacteria or their products, he calls *sozins*. Similar proteids resulting from acquired immunity in animals he calls *phylaxins*. Sozins are subdivided into those which have the property of killing bacteria, or *mycosozins*, and those which neutralize bacterial products, or *toxosozins*. A phylaxin which destroys bacteria he calls a *mycophylaxin*, and a phylaxin which neutralizes their ptomaines he calls *toxophylaxin*.

Ehrlich's side-chain theory has received much support. Ehrlich contends that each cell has side chains or processes, whose function is to assimilate particular food. Each of these processes is specific for a particular substance and will not unite with any other. These side chains are constantly being produced and cast off, in health as well as in disease. Either a lack or a superabundance of specific side chains may explain the nature of natural immunity. Side chains are also called *receptors* and have been grouped under three heads according to their action. The first group fixes or unites molecules of simple constitution; the second group has the power of combining with the food molecule, together with a symotoxic action; and the third group combines with the food molecule and also fixes a ferment in the fluid medium surrounding an *amboceptor*. The latter is a substance which acts as an intermediary between the invading bacterium and the complement; the complement being the destructive principle.

Consult: Roser, *Entzündung und Heilung* (Leipzig, 1886); Behring, *Die Blutserumtherapie* (ib., 1892); Sternberg, *Immunity: Protective Inoculations in Infectious Diseases and Serum Therapy* (New York, 1895); Chauveau, *Traité de physique biologique* (Paris, 1901); Simon, *Introduction to the Study of Infection and Immunity* (New York, 1914). For the method of securing artificial immunity by means of defensive proteids, see Antitoxin; Toxin; Serum Therapy; Vaccination.

IMMUNITY, in feudal law and in international law. See Feudalism; Inviolability.

IMOGEN, ĭm'ô-jĕn. The daughter of Cymbeline and wife of Posthumus, in Shakespeare's *Cymbeline*.

IMOGENE, ĭm'ô-jēn, The Fair. The heroine of Lewis's ballad "Alonzo the Brave and the Fair Imogene."

IMOLA, ē'mô-lȧ. An episcopal city on the Santerno in the Province of Bologna, Italy, 21 miles southeast of the city of Bologna (Map: Italy, C 2). It has a cathedral, dating from the twelfth century (modernized in the eighteenth), a communal library with some rare manuscripts, and an old citadel. There is also an agricultural school. It has been the seat of a bishop since 422. It markets wine and vegetables and manufactures silk goods, soap, leather, majolica, bricks, and gunpowder. Near by are mineral springs. In Roman times the city was called Forum Cornelii, said by Prudentius to have been founded by L. Cornelius Sulla. Here were born Chrysologus, Archbishop of Ravenna, who died in 449, and the painter Innocenzo da Imola, who died about 1550. Two of his paintings are in the communal palace. Pop. (commune), 1901, 33,210; 1911, 36,068.

IMOLA, Innocenzo da (c.1494–c.1550). An Italian painter, born at Imola. His real name was Innocenzo di Pietro Francucci, and he was the pupil of Francia at Bologna and of Albertinelli in Florence. Afterward he went to Bologna and painted the frescoes of the "Death and Assumption of the Virgin" at San Michele (1519), also the "Madonna in Glory," and a "Madonna with Kneeling Donors," both in the gallery of that city. Among his other works are altarpieces in the cathedral at Faenza, in Berlin, and in Munich. His best pictures are reminiscent of Raphael.

IMOSHAGH, ĕ'mô-shăg'. The national name of certain pastoral tribes of Tuaregs in the Sahara Desert, who are independent. See Tuareg.

IM'PACT (from OF. *impacter, empacter,* to press close together, from Lat. *impingere,* to dash against, from *in,* in + *pangere,* to fasten). If a body in motion meets a second body—either at rest or in motion itself—there is said to be an "impact" between them. The general principles of mechanics of course may be applied to the changes in the motion. (See Mechanics.) The geometrical sum of the linear momentum of the two bodies is not changed by the impact; nor is the sum of their kinetic energies, provided they are perfectly elastic. Consider the two bodies as moving along the same horizontal line. Let their masses be m_1 and m_2 and the velocities of their centres of inertia before and after impact be v_1 and v_2 and V_1 and V_2 respectively. Then, for all bodies

$$m_1v_1 + m_2v_2 = m_1V_1 + m_2V_2.$$

(This law was given by Wallis, Wren, and Huygens almost simultaneously, 1668. The first applied it to inelastic bodies, the last two to elastic ones.) If the bodies are absolutely inelastic, $V_1 = V_2$; if they are perfectly elastic,

$$\tfrac{1}{2}m_1v_1^2 + \tfrac{1}{2}m_2v_2^2 = \tfrac{1}{2}m_1V_1^2 + \tfrac{1}{2}m_2V_2^2;$$

if they are imperfectly elastic and of the same material, Newton has shown that

$$\frac{V_1 - v_1}{v_2 - V_2} = e,$$

a constant for a given kind of material, which is called the "coefficient of restitution." See Centre of Impact.

IMPAC'TION. See Horse, *Diseases.*

IMPALE' (from Fr. *empaler,* It. *impalare,* ML. *impalare,* to impale, from Lat. *in,* in + *palus,* pole). In heraldry, to arrange two coats of arms side by side in one shield divided per pale. It is usual thus to exhibit the conjoined coats of husband and wife, the husband's arms occupying the dexter side or place of honor, and the wife's the sinister side of the escutcheon. A husband impaling his wife's coat with his own is not allowed to surround the former with the collar or insignia of any order of knighthood to which he may belong. Bishops, deans, heads of colleges, and kings of arms impale their arms with their insignia of office, giving the dexter side to the former. In early heraldry, when two coats were represented in one shield side by side, only half of each was exhibited—an arrangement which had been called dimidiation (q.v.). Sometimes the one coat only was dimidiated. A reminiscence of dimidiation is preserved in the practice of omitting bordures, orles, and tressures in impaled arms on the side bounded by the line of impalement.

IMPAL'LA (African name). An antelope. See Palla.

IM'PANA'TION (Fr. *impanation,* Portug. *impanação,* It. *impanazione,* from Lat. *in,* in + *panis,* bread). A word coined in the Middle Ages to indicate a modification of the theory of transubstantiation. It first appears at the end of the eleventh century. Formed upon the model of the word "incarnation," it ought to denote that the divine Logos took upon Himself the elements of the bread and wine of the Eucharist, just as He did humanity in the Incarnation. But it was used to denote the view that, instead of a transubstantiation by which the substance of the bread and wine became the substance of the body and blood, there was in the Eucharist an assumption by the whole Christ, body as well as divine Logos, of the bread and wine, so that He was wholly present in them. This differs so little from Luther's personal view, which was that of the "sacramental permeation of the substance of the bread by the substance of the body," etc., that he was charged by Bellarmine and other Roman Catholics with reviving the old error of impanation. The official doctrine of the Lutheran church, however, is that of the "sacramental coexistence at the same place of the two substances, both continuing to exist in their unmodified integrity." See Lord's Supper; Transubstantiation.

IMPANEL. See Empanel.

IMPAR'LANCE (OF. *emparlance,* from *emparler,* to talk, from *en,* in + *parler,* to talk, from ML. *parabolare,* to discourse, from Lat. *parabola,* parable, from Gk. *παραβολή, parabolē,* comparison, from *παραβάλλειν, paraballein,* to place beside, from *παρά, para,* beside + *βάλλειν, ballein,* to throw). In common-law pleading, an allowance of time to the defendant in a civil suit to put in his defense. As the name indicates, the grant of time was originally made to enable the defendant, before pleading, to talk with the plaintiff, with the view of coming to an amicable understanding with him. Later, in certain classes of cases, the defendant was entitled to demand one imparlance for this purpose, and this practice in course of time became a mere device for securing a reasonable time in which to plead. The term is no longer in use either in England or the United States. Consult Blackstone, *Commentaries on the Laws of England.* See Plea; Pleading.

IMPAS'TO (It., covered with paste). The name given to the practice of laying on pigments so thickly as to be opaque. Certain schools at one time loaded with color the light portions of their picture and left the shadows thinly painted. In this way they thought to secure transparency, as it was called, in the shadows. The practice to-day, however, is to attain transparency in shadows by their exact relation to the light parts of the picture, and this is usually done by painting all parts with equal thickness of pigment.

IMPATIENS, ĭm-pā'shĭ-ĕnz. See Balsam.

IMPEACH'MENT (OF. *empeschement,* Fr. *empêchement,* hindrance, from OF. *empescher,* Fr. *empêcher,* to hinder, from ML. *impedicare,* to entangle, fetter, from Lat. *in,* in + *pedica,* fetter, from *pes,* foot). In the most general sense, the legal process of calling a person to account for some misconduct, or of discrediting a witness, a document, or a record. Specifically, in English and American law, the accusation and trial of a person for treason or high crimes or misdemeanors by the legislature. In England impeachment differs from the ordinary criminal prosecution in two respects: (1) the prosecutor is the House of Commons, and not the crown; (2) the trial court is the House of Lords, and not an ordinary judicial tribunal. In the United States an impeachment is generally instituted and prosecuted by the Lower House of Congress or of a State Legislature before the Upper House or Senate, although a few of the States provide for impeachments in the ordinary courts of justice, and in some the judges of the highest appellate court sit with the Senators as members of the Court of Impeachment.

This method of prosecuting criminals was employed for the first time in England, in the case of Lord Latimer and others, who were accused of frauds and malpractices connected with the revenues of the crown in the latter part of the reign of Edward III, and who were found guilty and condemned to imprisonment and removed from office. Several other cases of impeachment of crime followed; but after 1459 acts of attainder (see ATTAINDER) took the place of impeachments for nearly two centuries. Under the Stuarts, however, Parliament again returned to impeachments as an effective method of dealing with officers of the crown who were corrupt or oppressive. In 1621 Sir Giles Mompesson and Lord Bacon were impeached and convicted, removed from office, and heavily fined for gross official misconduct. Since that date there have been 52 cases of impeachment in England, of which number but one has occurred within recent years, and that one in 1805. The proceeding is practically obsolete there.

In the United States, however, it is still a live and vigorous institution. The court for the trial of impeachment is accounted the very capstone of American judicial systems, Federal as well as State. Its existence is secured and its organization is regulated by national and State constitutions. For example, the organic law of the Union provides that "the House of Representatives shall have the sole power of impeachment" (Art. I, Sec. 2, cl. 5), and "the Senate shall have the sole power to try all impeachments. When sitting for that purpose," it is declared, "they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present. Judgment in cases of impeachment shall not extend further than to the removal from office and disqualification to hold and enjoy any office of honor, trust, or profit under the United States, but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law." (Art. I, Sec. 3, cl. 6 and 7.) The Constitution further provides that "the President . . . shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment" (Art. II, Sec. 2, cl. 1); and again, "the President, Vice President and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors." (Art. II, Sec. 4.) Similar provisions are contained in nearly every State constitution, although a few States remit impeachment trials to the ordinary courts of justice.

Impeachment in England is only a specialized method of exercising the judicial functions of the High Court of Parliament and is not necessarily confined to the prosecution of officers of the crown. Commoners as well as lords may be tried by this method, though in practice it has usually been employed only in the case of public officials. In the United States, however, it exists only as a means of removing from office an officer of the government who has by his misconduct forfeited his right thereto. This restricted scope of the process of impeachment in America has given rise to some important questions. One of these is the question whether an official can escape impeachment by resigning his office. The Senate of the United States decided in the case of Belknap, by a vote of 37 to 29, that he cannot. On the other hand, the Supreme Court of Nebraska has held that the prime object of impeachment proceedings is to protect the State from official misconduct, and that as soon as an officer resigns, the reason for resorting to these proceedings ceases. Thereafter the offender is to be prosecuted like any other criminal by indictment and trial in the proper judicial tribunal.

Differences of opinion have developed, also, in the United States concerning the nature of impeachable offenses. According to one view, only such official misconduct as renders the wrongdoer liable to indictment will warrant an impeachment; while another view is that this proceeding was intended to be very elastic and comprehensive and to be applicable to every sort of official misdemeanor which is subversive of any fundamental or essential principle of government or highly prejudicial to the public interests. This view was adopted by the House of Representatives in preparing its articles of impeachment of President Johnson and has been approved by the Supreme Court of Nebraska. It has been embodied in the constitutions of some of the States.

In the recent impeachment of Governor Sulzer of New York (1913), the question was raised for the first time whether a public officer was liable to impeachment for acts committed by him before as well as after his assumption of office, and it was decided by the High Court of Impeachment that it was not limited to acts of an official character nor to acts committed by the impeached official while in office.

Bibliography. The literature upon this topic is quite extensive, both in England and in America. Blackstone, *Commentaries* (1st ed., 4 vols., London, 1765–69); *Chase's Trial* (Baltimore, 1805); *Prescott's Trial* (Boston, 1821); *Impeachment of President Johnson* (Washington, 1868); *Belknap's Trial* (ib., 1876); Story, *Commentaries on ~~the~~ Constitution* (Boston, 1882); Stephen, *History of the Criminal Law of England* (London, 1883); *Peck's Trial* (Boston, 1883); Anson, *Law and Custom of the Constitution* (Oxford, 1886); Mechem, *On the Law of Public Offices and Officers* (Chicago, 1890); Pike, *Constitutional History of the House of Lords* (London, 1894); Foster, *Commentaries on the Constitution of the United States* (Boston, 1895); May, *Parliamentary Practice* (10th ed., London, 1901); Griffin, *Select List of References on Impeachment* (Washington, 1905).

IMPEACHMENT OF WASTE. Liability

for waste committed by a tenant for life or years. The law of waste, of great antiquity, and obviously devised to protect the inheritance against the depredations of tenants, was in the course of time developed by judicial refinements into a barbarous code of restrictions which seriously hampered the tenant in the reasonable use and enjoyment of his estate. Its sole aim was to perpetuate the existing condition and use of the land and to preserve it intact for the landlord.

It was waste for the tenant to cut timber for any purpose but necessary repairs; it was waste to make any substantial improvement, as by converting waste or meadow lands into arable land, or by erecting new buildings or enlarging or rebuilding old ones; and it was waste, for which the tenant was held liable, if buildings were destroyed by the act of an incendiary or by accident, or if timber was cut by a trespasser without the tenant's fault; and the penalties for waste were of the Draconian order—forfeiture of the estate and a fine, or amercement, of three times the value of the "waste" committed or suffered.

Under these circumstances a devise of an estate for life or years was a gift of doubtful value, and accordingly it became common in such devises or in marriage settlements to provide that the estate should be held "without impeachment of waste."

This provision was held to relieve the tenant from all liability under the common law of waste and to permit him to deal with the land very much as though it were his own. But the abuse of this privilege is restrained by the courts of equity, which will by injunction interpose to prevent the wasteful destruction of the woodlands of the estate, the cutting down of ornamental timber, or the defacing or destruction of the family mansion. See Waste.

IMPE′DANCE. A word used in connection with alternating electric currents to express a property of the circuit which corresponds in some respects with that of electric resistance in the case of steady currents. If in an electric circuit there is a resistance R and an inductance L, and if an alternating electromotive force $E = E_0 \cos pt$ is introduced, thus making the frequency $2\pi/p$, i.e., the "number of alternations" $4\pi/p$, the resulting electric current is

$$J = \frac{E_0 \cos (pt - \alpha)}{\sqrt{R^2 + p^2L^2}},$$

where $\tan \alpha = \frac{pL}{R}$. The quantity $\sqrt{R^2 + p^2L^2}$ is called the "impedance."

Similarly, if the circuit contains, in addition to the resistance R and the inductance L, a condenser of capacity C, the resulting current is

$$J = \frac{E_0 \cos (pt - \alpha)}{\sqrt{R^2 + p^2\left(L - \frac{1}{p^2C}\right)^2}},$$

where $\tan \alpha = \frac{p\left(L - \frac{1}{p^2C}\right)}{R}$. This gives a more general value of the impedance. The angle α is, for obvious reasons, called the "angle of lag." In the above expressions all the electric quantities are supposed to be measured in the "C. G. S. electromagnetic" system.

IMPED′IMENTS TO MARRIAGE. Facts which constitute a bar to the contracting of a lawful marriage. Such impediments were recognized by the Church and were cognizable by the ecclesiastical courts as a basis for annulling a marriage contracted while they existed, and they are recognized by all nations under the Christian dispensation. In English and American law the following impediments to marriage are recognized: (1) the existence of a prior, undissolved marriage; (2) relationship within the prohibited degrees; (3) want of sufficient age; (4) mental incapacity; (5) physical incapacity; and (6) force, fraud, or mistake. See Bigamy; Prohibited Degrees; Age, in Law; Insanity; Impotency; and, for a general treatment of the subject, Marriage.

IMPEND′ING CRISIS, The. See Helper, Hinton Rowan.

IMPER′ATIVE, Categorical. See Categorical Imperative; Ethics.

IMPERATIVE MOOD. See Conjugation.

IM′PERA′TOR. See Emperor.

IMPE′RIAL. A city in Imperial Co., Cal., 25 miles south of Old Beach, on the Southern Pacific Railway (Map: California, K 10). It is in a rich agricultural and stock-raising country, carries on a large trade in farming implements, cotton, and fruits, and has a cotton compress, brewery, meat-packing plant, creamery, cement works, soap factory, stockyards, and cantaloupe and grape packing houses. The city contains a fine high school and a public library and owns its water works. Pop., 1910, 1257.

IMPERIAL CHAMBER (Ger. *Reichskammergericht*). One of the two highest courts of the Holy Roman Empire, coördinate with the Aulic Council (q.v.). It was created in 1495 by the Emperor Maximilian under pressure of the princes of the Empire, whose influence was greatly strengthened by the erection of the new tribunal, and lasted until 1806, when the Empire was dissolved. It was composed of a president nominated by the Emperor, two vice presidents, and a number of associate judges, varying at different times from 16 to 50, selected partly from among men learned in the law and partly from the ranks of the nobility. Its jurisdiction included primarily all cases involving the princes of the Empire, but it sat also as the highest court of appeal in civil cases involving the interests of the member of any estate. It also offered redress for any refusal, delay, or miscarriage of justice on the part of any inferior court. Its sessions were held at Frankfort, Speyer, and, from 1693 to 1806, at Wetzlar. Its greatest contribution was to make the Roman law the uniform law of Germany. See Holy Roman Empire.

IMPERIAL CITY, The. A title frequently given to Rome.

IMPERIAL EAGLE. See Eagle.

IMPERIAL FEDERATION. A plan to unite the parts of the British Empire by a stronger tie than that of the crown. Such a plan was conceived as early as the middle of the eighteenth century, but the motive of the mother country at that time was chiefly the extraction of revenue from its colonies, and the more important of them successfully revolted on that issue. Again, the policy of a strict control over the remaining colonies was one of the principal causes of the rebellion in Canada in 1837. The policy of granting responsible government in the colonies was substituted on that occasion. This was in some quarters adjudged to be a badge of potential independence, and for several years the professed desire that the colonies should be detached as a means of relief from the burdens entailed by them was not uncommon. But from this extreme anti-imperialism the demand for a more united Empire has quite steadily developed for half a century, having been fostered in recent years by the growing consciousness of the need of defense and the benefit from reciprocal trade relations. In 1868 The Royal Colonial Institute was founded and took as its motto "United Empire." Four years later Disraeli, in a memorable speech, voiced the opinion that self-government in the colonies "ought to have been conceded as a part of a great policy of Imperial consolidation . . . ought to have been accomplished by the institution of some representative council in the metropolis which would have brought the colonies into constant and continuous relation with the home government." In July, 1884, a gathering of leading members of both the Liberal and Conservative parties, in London, under the presidency of the Right Hon. W. E. Forster, resulted in the formation, in November of the same year, of the Imperial Federation League. Branches or allied organizations were established in many parts of the Empire, and in 1886 the league petitioned the Prime Minister to summon an Imperial conference for the express purpose of forming an Imperial council. The petition was granted only to the extent of calling a conference to consider "union for purposes of mutual defense." However, the meeting of that first Imperial conference was a distinct advance towards practical imperialism, and the conference has since become an established institution, meeting in 1894, 1897, 1902, 1907, and 1911. Besides the subject of defense there were, even at the first conference, important deliberations on the question of Imperial preference in trade. At the meeting held in Ottawa in 1894 preferential trade and the development of trade within the Empire by means of improved communication were the chief topics discussed. The keynote of the discussions was loyalty to the mother country and a determination to maintain intercolonial solidarity, but there was some doubt if the mother country would permit herself to be outvoted by a combination of the colonies, or whether each part would be willing to aid the others in matters not directly affecting itself. For such questions Joseph Chamberlain, the stanchest of the Imperialists, soon had a solution in his proposal of complete free trade within the Empire and liberty for each state to fix its own tariff rates on foreign goods. This proposal, however, was not popular in the mother country, and the cause of imperialism was furthered at this time rather by the loyalty of the colonies during the Boer War of 1899–1902. In 1905 Sir Frederick Pollock formulated a scheme for a representative Imperial council to act in an advisory capacity to the ministry and the administration. At the conference held in London in 1907 it was unanimously resolved, "That it will be to the advantage of the Empire if a conference, to be called the Imperial Conference, is held every four years, at which questions of common interest may be discussed and considered as between his Majesty's government and his governments of the self-governing dominions beyond the seas." The conference thus permanently established is made to consist of the several prime ministers, the Secretary of State for the Colonies, and such other ministers as each government may appoint, but not more than two representatives from any government may take part in a discussion, and each government has only one vote. It is further provided that in the interim between two full conferences important questions may be referred to subsidiary conferences of representatives from the governments concerned, and the colonies are authorized to refer to the Committee of Imperial Defense any local question requiring expert advice. Much closer than ever before were the representatives of the Empire drawn together in the Conference of 1911 on the question of defense, and it was then and there agreed that naval training and discipline in the colonies should be made uniform with that of the United Kingdom, and that there should be an interchange of officers and men. The same conference recommended the appointment of a representative royal commission to investigate and report on the natural resources of the several parts of the Empire and the facilities for their development, and it was appointed the following year. The proceedings of this conference show an increase in the number and variety of subjects discussed, and that the establishment of an advisory council was still urged in some quarters.

Bibliography. Pollard, *The British Empire: Its Past, its Present, and its Future* (London, 1909); Jebb, *The Imperial Conference* (ib., 1911); *Proceedings of the Imperial Conference* (ib., 1907 and 1911); Amery, *Union and Strength* (ib., 1912); Bussell, *A New Government for the British Empire* (ib., 1912); D'Egville, *Imperial Defense and Closer Union* (ib., 1913).

IMPERIAL INSTITUTE OF THE UNITED KINGDOM, THE COLONIES, AND INDIA. A memorial of the Queen's Jubilee of 1887, which is a public institution in South Kensington intended to contain "sample collections of the natural products and resources of every portion of the British Empire, so arranged and displayed as to be of practical benefit to commercial business men and to allow of scientific research by every class of students." It is furnished, therefore, with laboratories and with reading and lecture rooms as well as with exhibitory departments. In 1902 it was transferred to the Board of Trade by act of Parliament.

IMPERIALISM. The policy of extending the dominion of a state beyond the limits of self-coherent or at least potentially self-coherent nationality. The extension of the dominion of the United States over Louisiana and over the territories acquired from Mexico was not imperialistic, since such territories would eventually become homogeneous in population and institutions with the original territory of the United States. The annexation of the Philippines and Porto Rico, on the other hand, was essentially imperialistic, since no rational basis existed for contemplating their complete assimilation, and assimilation was not in fact contemplated by the United States. The annexation of Alsace-Lorraine by Germany was not imperialistic, because complete assimilation was contemplated.

The earliest historical examples of imperialism are the great monarchies of Asia and Africa: Assyria, Persia, Egypt. The Roman Empire is the one great example of the policy in ancient Europe. The Imperial policy was revived by Charlemagne in the Middle Ages and never wholly disappeared; it culminated, in early modern times, in the Empire of Charles V, which in the middle of the sixteenth century included the Hapsburg dominions, Spain and Portugal, Naples, Sicily and Sardinia, the Netherlands, and the East and West Indies, conceived broadly to include mainland as well as islands. The extension of the personal dominion of Napoleon over non-French territories is the most striking instance of imperialism in recent times.

Down to the collapse of the power of Napoleon imperialistic policy uniformly set for itself as ultimate object dominion over the whole accessible world. After 1815 European politics were characterized by a remarkable development of the idea of nationality. Liberal opinion everywhere recognized the desirability of complete independence and unification of each naturally homogeneous nation. Among the results of the nationalist movement were the unification of Germany, the liberation of Italy from Austrian rule and its consolidation, the liberation of Greece and the Balkan states from Turkish rule. The separation of Norway from Sweden and the wars of 1912–13 in the Balkans were the latest fruits of the nationalist movement. Strivings for autonomy on the part of Hungary, Poland, Finland, and Ireland were equally inspired by the same tendency.

During the nationalist period the opinion was widely current that colonies and dependencies that could not be incorporated in the national life represented a burden upon the state. British liberal statesmen, like Cobden and Gladstone, looked forward to the time when the colonies with inhabitants of British origin should be independent. In accordance with this view Canada, Australia, New Zealand, and Cape Colony were, between 1840 and 1870, given practically complete autonomy. Colonies inhabited by non-Europeans, like India, were regarded by the same school of statesmen as an encumbrance, to be borne only until the problem of orderly government in such colonies could be solved.

Shortly after 1870 a new imperialistic movement made itself manifest in European politics. Unlike that of earlier periods, the new imperialism accepted the principle of national independence in so far as civilized states are concerned. The British imperialist would not subject to British rule France or Spain or any other modern industrial state. Only the states supposed to be incapable of self-government are regarded as fit subjects for Imperial dominion. The new imperialism contemplates not one, but a number of world states, each consisting of a civilized power together with its permanent dependencies and protectorates.

The impetus to the new imperialism was given by the Franco-Prussian War. France, deprived of Alsace-Lorraine, turned to her African province of Algeria to restore her forces. Active colonization of Algeria was soon followed by extension of the borders of the province. Thus was inaugurated the struggle between nations for the partition of Africa, which eventually engaged France, Great Britain, Germany, Portugal, Belgium, Spain, and Italy. Parallel with the partition of Africa was the progress of imperialism in Asia, in which Great Britain, France, Germany, Russia, and Japan took part. The United States also, through the annexation of Hawaii, the Philippines, and Porto Rico, was drawn into the imperialistic movement. The years 1884–1901 represent the period of most rapid extension of Imperial dominion. The following table gives a summary of the colonial acquisitions during those years:

COUNTRIES	Area, sq. m.	Population
Great Britain	3,711,957	57,436,000
France	3,583,580	36,553,000
Germany	1,026,220	16,687,100
Russia	112,320	3,300,000
Belgium	900,000	30,000,000
Portugal	800,760	9,111,757
Italy	185,250	867,000
Japan	13,991	3,000,000
United States	125,000	10,004,000

From 1901 to 1914 the principal imperialistic advances were the following: annexation of Korea by Japan (84,738 square miles), 1910; annexation by Italy of Tripoli and Cyrenaica (406,000 square miles), 1912; cession by France of 107,270 square miles in Central Africa to Germany, 1911; establishment of French protectorate over Morocco (176,000 square miles), 1912; Russo-British establishment of spheres of influence in Persia, 1907 (Russian sphere, 305,000 square miles; British, 137,000 square miles; neutral, 188,000 square miles). Informal imperialistic enterprise is embodied in the agreement between China and Russia of 1913, by the terms of which Russia recognized the sovereignty of China in Mongolia; but both powers agreed to refrain from colonizing or sending troops into the territory, while Russia assured herself of substantial control through a six-million-ruble loan to the province, and through free trade between Mongolia and Russian territories. A similar enterprise appears in the agreements between Russia and Japan as to their respective interests in Manchuria; and in the control by the United States of the finances of Santo Domingo. Upon entry of Turkey into the Great European War in 1914 Great Britain proclaimed the annexation of Cyprus and Egypt a British protectorate.

The resurgence of imperialism since 1870 is closely connected with the revival of protectionism in the United States after the Civil War; in Germany and France after the Franco-German War; and in Russia, Japan, and Italy in the last two decades of the nineteenth century. The apparent determination of the several Great Powers to create a national industry adequate to supply domestic needs as well as to provide a balance of exports gave an impetus to the policy of annexing nonindustrial territories the markets of which could be protected against hostile customs regulations. A further impetus was given to the movement by the reduction in cost of railway building, following the substitution, in the seventies, of steel for iron rails. This change made possible the opening up of barbaric districts that had formerly been of slight commercial value and created a new field for lucrative investments. In relatively few instances, however, did the acquisition of colonies prove to be profitable to the colonizing nation, if account be taken of the military and naval expenditures occasioned directly or indirectly by the imperialistic policy.

Since modern imperialism is a competitive policy, it has played a large part in fomenting discord among the Great Powers. The Chino-Japanese, the Russo-Japanese, the Boer, and the Turco-Italian wars are the more important conflicts directly due to the imperialist tendency. The Spanish-American War while perhaps chiefly a result of humanitarian agitation against the Spanish methods of suppressing insurrection in Cuba, was not wholly uninfluenced by imperialist motives. In addition to armed conflicts several serious international crises must be set down among the moral costs of imperialism. At the time of the Fashoda incident (1898) England and France were brought to the verge of war over the delimitation of their respective claims to Soudanese territory. In 1905, and again in 1911, France and Germany came very near war over the question of the French advance in Morocco. The international hostilities originating in imperialism played an important part in bringing on the Great European War of 1914. See WAR IN EUROPE.

In most of the Imperial nations political parties of greater or less strength have sought ineffectually to check the imperialistic tendencies. In the United States, after the acquisition of the Philippines, an active agitation was carried on by the so-called anti-imperialists, having for its object the grant of independence to the Philippines. Anti-imperialism was indorsed by the Democratic party in 1900 and commanded the loyalty of many of the leaders of that party for over a decade. In England the party opposed to the further extension of British dominion were known opprobriously as "Little Englanders." In continental states opposition to imperialism was especially strong among the Socialistic parties. The designs of Italy upon Abyssinia in 1896 were frustrated, in part, by the anti-imperialistic agitation of the Socialists at home; and popular antipathy to imperialistic designs contributed to the defeat of the Russians in the war with Japan.

The term "imperialism" is also employed to designate the movement in Great Britain and her self-governing colonies towards a closer form of union. See IMPERIAL FEDERATION.

Consult: J. A. Hobson, *Imperialism* (New York, 1902); Ernst Freund, *Empire and Sovereignty* (Chicago, 1903); Erich Marcks, *Die imperialistische Idee in der Gegenwart* (Dresden, 1903); Achille Viallate, *La crise anglaise* (Paris, 1905); G. v. Schulze-Gaevernitz, *Britischer Imperialismus und englischer Freihandel* (Leipzig, 1906); P. Adam, *Les Imperialismes* (Paris, 1908); Earl Cromer, *Ancient and Modern Imperialism* (London, 1910).

IMPERIAL MOTH. The largest of the "royal moths" (*Basilona imperialis*), sulphur yellow marked with purplish brown. The wings expand from 4 to 5 inches; the larva is thinly clothed with hairs and bears spiny horns on the second and third segments. It feeds on the hickory, butternut, and other forest trees.

IMPERIAL SERVICE ORDER, THE. A new order instituted in London, June 26, 1902, by King Edward VII, to confer honor on those who have held continuous office under the British crown either in England or in the colonies. The order consists of a sovereign and companions. The number of companions is limited to 425, of whom 250 are to belong to the Home Civil Service and the remainder to the Civil Services of the Colonies and Protectorates. Appointments to the order will be made after 25 (or in unhealthy colonies 16) years' service.

IMPERIAL WOODPECKER. See IVORY-BILL.

IMPE'RIUM (Lat., power, jurisdiction). A term applied to the sovereign power of a Roman magistrate, especially when such magistrate was in command outside of Rome. (See EMPEROR.) When Augustus took under his own control all the important functions of the state, and the (nominal) republic was merged into a monarchy, the *imperium* became the exclusive prerogative of Augustus and his successors, and *imperator* passed to its modern meaning of emperor. Consult Smith, *A Dictionary of Greek and Roman Antiquities*, vol. i (3d ed., London, 1890), and Greenidge, *Roman Public Life* (ib., 1901).

IM'PETI'GO (Lat., from *impetere*, to attack, from *in*, in + *petere*, to seek). A disease of the skin. The term was formerly applied to many different diseases of the skin which were characterized by pimples, pustules, and scales. In modern practice the term is restricted to a disease of the skin characterized by an eruption of small itching pustules, single or in groups, terminating in scaly crusts of a yellowish color. Hebra and more recent writers discard the term and classify the old impetigo as a form of eczema (q.v.). Tillbury Fox, of London, describes impetigo contagiosa as an acute pustular, contagious skin disease, during which the patient suffers from fever, with vesicles and pustules on the face and hands, and thence extending to other parts of the body and followed by the production of yellowish crusts. Impetigo herpetiformis is a similar, noncontagious eruptive dermatosis, occurring in pregnant women, attended with grave general symptoms. Impetigo rodens is either cancer or syphilis. For treatment of impetiginous eczema, see ECZEMA.

IMPEY, ĭm'pĭ, SIR ELIJAH (1732–1809). An English jurist, Chief Justice of Bengal, born at Hammersmith. He was educated at Westminster School and at Trinity College, Cambridge (B.A., 1756), and was called to the bar in 1756. He was counsel for the East India Company in 1772 and two years later was knighted and sent out to Calcutta as the first Chief Justice under the new regulating act. He naturally sided with his old schoolfellow, Warren Hastings, in that governor's political troubles, and this course of conduct, together with his condemning to death the famous forger Nuncomar, brought about his own recall and impeachment (1783); but he was discharged with honor, having been revealed as an amiable and upright judge, perhaps a trifle vain and too easily led by Hastings. Impey was elected member of Parliament for New Romney in 1790, but, although he held his seat until 1796, retired to the country in a couple of years, and spent his latter days in educating his family and enjoying the society of his friends. Consult *Memoirs of Sir Elijah Impey* (London, 1847).

IM'PEYAN PHEASANT. See PHEASANT.

IM'PLEMENTS, AGRICULTURAL. A loose term applied to all implements and tools used in farming, not only in the tilling of the soil, but in harvesting and the later preparation of the crop for market. Doubtless the first implements used were such as required only human strength in their manipulation. The crude spade, hoe, rake, sickle, or scythe, and the flail of the ancients are the prototypes of the modern plow, cultivator, harrow, self-binder, and threshing machine. After animals were subdued by man, the primitive plow and harrow appeared. Cultivators and other implements for clearing the ground of weeds and stirring the soil are all modern inventions. Especially during the last century have improvements been made in almost every kind of farm implement. Indeed, not a few first appeared during that period, notably the perfected manure spreader, seed and fertilizer drills, harvesters, hay loaders and stackers, and combined harvester and thresher. The threshing machine has not only supplanted the flail and the use of animals in treading out the grain, but has also rendered obsolete the ancient methods of winnowing away the chaff. In short, every necessary operation of the farm is now performed with some implement or machine specially adapted to the purpose, and horse, steam, wind, electric, and other forms of power have supplanted manual labor as far as such substitution has been deemed feasible. It is largely because of the extensive use of labor-saving machinery that the United States has enjoyed such a high degree of agricultural prosperity. The value of agricultural implements manufactured in the United States in 1909 was $146,329,268, an increase of 44.6 per cent since 1900. This was the product of 640 establishments, employing 50,551 persons. The value of agricultural implements used in the United States per acre of farm land was $1.44, an increase of 61.8 per cent since 1900. Since the publication of Thomas's *Farm Implements and Machinery* (1859 and 1869), a few American books have appeared which illustrate and describe many farm conveniences and appliances; but improvements in farm implements have been so numerous and important, and the applications of science so striking, that all works on the subject are inadequate.

Consult: Myrick, *Farm Conveniences* (New York, 1884); Martin, *Farm Appliances* (ib., 1892); R. L. Ardrey, *American Agricultural Implements* (Chicago, 1894); Bailey, article "Tools," in *Cyclopedia of American Horticulture* (New York, 1900); Coupan, *Machiner de culture* (Paris, 1907); P. McConnell, *Farm Equipment* (New York, 1910); R. Cobleigh, *Handy Farm Devices* (ib., 1910); L. W. Ellis, *Minor Articles of Farm Equipment*, United States Department of Agriculture, Bureau of Plant Industry, Circular 44 (Washington, 1911); Carson and others, *Horse, Truck, and Tractor* (Chicago, 1913); Bornemann, *Die Motorkultus in Deutschland* (Berlin, 1913). See Harvest and Harvesting; Threshing; etc.

IMPLU′VIUM (Lat., receptacle for rain water). A tank or basin in the centre of the court or atrium of a Roman house, placed immediately under the unroofed part, or *compluvium*, of the atrium, to receive the rain discharged from the roofed portion. The impluvium was commonly of marble, was frequently adorned with a fountain, and with busts, statues, and vases, and formed a very peculiar and interesting feature in the house. The term was also applied to the open space under the compluvium, even if unprovided with a collecting basin.

IMPOON, im-pōōn′ (Zulu name). One of the duikers (*Cephalophus grimmi*), a small antelope, very plentiful in South Africa, in wooded districts. See Duiker.

IM′PORTS AND EX′PORTS. See International Trade; Commerce; Balance of Trade; for exports and imports of the several nations, see articles on those nations.

IM′POST (Fr. *imposte*, from Lat. *impositus*, p.p. of *imponere*, to place upon, from *in*, in + *ponere*, to place, from *po-*, Gk. *ἀπό*, *apo*, away + *sinere*, to allow). The top or cap of a pier or abutment from which an arch is sprung; the stone immediately under the springer of an arch. This stone is usually emphasized by being made to project and by moldings, especially in the classic and neo-classic styles. (See Illustration under Arch.) In Gothic architecture, especially late Gothic, the arch often springs from the pier without any impost, architecturally speaking. When an arch springs from coupled columns, an architrave or entablature is interposed as an impost between the capitals and the arch. In some early Christian basilicas and in Byzantine buildings an impost block is often interposed between the arch springer and the capital, even over single columns.

IMPOS′TORS, The Three (Lat. *De Tribus Impostoribus*). The name given to a work alleged to deny all divine revelation, characterizing the three great founders of religions—Moses, Jesus, and Mohammed—as impostors. Though it is often mentioned since the tenth century, and attributed to heretics of various ages and various degrees of eminence, no authentic copy is known to have ever been seen. A book bearing this title, and professedly published in 1598, was reprinted by E. Weller, with German translation, Leipzig, 1846; without the translation, Heilbronn, 1876. In the eighteenth century renewed attention directed to the subject by the spread of infidelity caused the appearance of an apocryphal edition, which has been frequently reprinted. Consult Genthe, *De Impostura Religionum* (Leipzig, 1833).

IM′POTENCY (from Lat. *impotentia*, inability, from *impotens*, powerless, from *in-*, not + *potens*, able, from *potis*, powerful; connected with Lith. *patis*, Skt. *pati*, lord). In law, an incurable incapacity to perform the sexual act. As the procreation of children is deemed the principal object of marriage, the ability to procreate is considered an implied condition of the marriage contract; and the marriage of an impotent person, the disability not being known to the other party, is regarded as a species of fraud which vitiates the transaction and entitles the defrauded party to have it set aside or declared null and void. This is not properly a divorce, though in some American statutes it is so denominated, as a divorce is properly the dissolution of a valid marriage, and accordingly a decree nullifying a marriage on the ground of the impotency of one of the parties was recognized by the Church, which does not tolerate divorce, and may be granted in a State, like South Carolina, which does not recognize any ground for divorce. The annulment of the marriage for impotency may be obtained by either party if the disability existed at the time of marriage and is incurable, whether it results from a defect caused by nature, or by accident or disease, or by the acts of the party. It has been held, however, that, "where impotency is simply the result of old age, the marriage is still binding; that a man of 60 who marries a woman of 52 should be content to take her *tamquam soror*." The burden of proving impotency is upon the party alleging it as a ground for the nullification of the marriage. See Divorce; Husband and Wife.

IMPOUND'ING. The act of putting in a place of custody cattle which have strayed on one's land and are found there doing damage, or which have been taken up as estrays, or goods which have been taken by distress. The right of impounding cattle doing damage was an incident of the right of the party injured by the trespass to hold them until the owner had made compensation for the damage committed by them, which was a species of common-law lien; whereas the impounding of estrays was for the safe-keeping of the animals until the owner reclaimed them. There were public pounds in many parishes, and where these were of convenient access the party taking up the cattle was bound to impound them there. Where this was not feasible, they might be impounded on the premises of the finder or taker. See Estray; Lien; Pound.

The term "impounding" is also used for the retention of a deed or other legal document in the custody of a court in which it is produced. This may be done where the instrument is suspected of being forged, or is otherwise of such a character as to satisfy the court that it may be used as the basis of a criminal prosecution, or it may be done merely for the purpose of preventing its being made away with by the person having the custody thereof. It is then impounded by order of the court, in order that it may be available when required.

IMPRES'SIONIST PAINTING (from Lat. *impressio*, from *imprimere*, to impress, from *in*, in + *premere*, to press). The practice of painting objects in nature as they first strike the eye, without selection or elaboration. Strictly, every painter is an impressionist in so far as he renders his own impressions, and the term Luminists has been proposed by Van Dyke as more appropriate, since the school is mainly concerned with rendering light. The theory is as follows: The only source of color in nature is the sunlight, which by its vibrations envelops and reveals all things. Without light we see no color at all; with it certain spots of color, according as the rays of the spectrum reflect a particular shade. The idea of outline is an artificial one. The impression of form, perspective, and distance is conveyed to us by different values of color. Shadow is but a different quality of light, modified by refractions and reflections. The painter therefore should only paint with the seven colors of the spectrum, discarding all others. He should juxtapose them just as in nature, trusting to distance to produce the effect. Thus only can he attain the actual, ever-changing effects of light. As the Impressionists are concerned with the representation of nature, they constitute a branch of the Naturalist school, corresponding to the modern Naturalists of sculpture and literature. They differ from Realists like Courbet in that they paint only the appearance of nature—what they actually see —not what they know it to be. It presents, they say, a series of flat, colored surfaces, and not figures in rounded contours. Their pictures are marked by an absence of modeling.

The chief object of the Impressionists is to render the effects of light. They paint everything in full light and condemn the practice of painting in the studio as giving untrue tones. All their pigments are light. Bright colors are placed side by side, and the school avoids the middle tones by which earlier painters achieved harmony of color. Their works, being momentary impressions, are marked by great rapidity of execution and seem sketchy in character. Indeed, the members of the school have justly laid themselves open to the criticism of exhibiting unfinished sketches for pictures. Closely inspected, their paintings seem mere blotches of color roughly applied; but seen at a distance they present pictures strikingly true to nature. Their rapidity of execution enables the Impressionists to portray motion and the nuances of expression to an extent not previously attained. Their figures are real men and women in the actions of daily life, not models posed in a studio. They took the final step in the liberation of modern art from ancient tradition in color—a revolution begun by the Romanticists under Delacroix and continued by the Realists under Courbet. Being the latest school, they came nearest to solving the specific problem of nineteenth-century art—the representation of light, color, and movement.

The Impressionists found their way to public favor very slowly. At first they were the subject of much ridicule. Edouard Manet, the founder of the school, had to exhibit his first Impressionist picture in the Salon des Refusés in 1863. A powerful factor in their progress to public favor was their championship by Zola, whose articles in behalf of Manet attracted great attention. They were much aided by the picture dealer Durand-Ruel, who, at a time when they were generally condemned, held exhibitions of their work side by side with that of the Barbizon masters. It was not until the early seventies that critics and the general public began to take them seriously. Painters, however, were quicker to recognize the progress in color and atmosphere which impressionism represents. Its work is quite generally accepted and followed, and its permanent influence has been to raise the pitch of light in present painting.

The greatest names connected with the long history of impressionism are, besides Manet, Edgar Degas, Claude Monet, for the landscape, and Auguste Renoir; associated with and influenced by whom were Pissaro, Sisley, Berthe Morisot, Mary Cassatt (an American), and Boudin. Mention should be made of a series of painter illustrators connected with the movement, such as Raffaelli, Toulouse-Lautrec, Forain, and Cheret. Among important painters who have adopted the principles of impressionism, yet whose work represents more or less of a compromise with the earlier school, are Bastien-Lepage, L'Hermitte, Gervex, Dagnan-Bouveret, Carrière, Besnard, and Aman-Jean. Impressionism has had a powerful effect upon the art of Germany and Austria, especially that of Munich. In Great Britain its influence was greatest in the Glasgow school. In Spain it counts among its adherents the two greatest among present-day painters, Sorolla and Zuloaga. In the United States also its influence has been very great, and among its direct adherents may be numbered artists like Theodore Robinson, J. A. Weir, Twachtman, and Childe Hassam.

Bibliography. Among the best accounts of the movement are: Duranty, *La nouvelle peinture* (Paris, 1876); Duret, *Les peintres impressionistes* (ib., 1878; new ed., 1907); Lecomte, *L'Art impressioniste* (Berlin, 1892); Muther, *History of Modern Painting* (London, 1896); Mauclair, *The French Impressionists*, translated from the French (ib., n. d.), a brief but highly interesting account; Meier-Graefe, *Impressionisten* (Munich, 1907); Wiesbach, *Impressionismus—ein Problem in der Antike und Neuzeit* (2 vols., Berlin, 1910–11).

IMPRESS′MENT. The seizure of the person or the personal property of individuals for the service of the state. The right of impressment is analogous to the power of eminent domain (q.v.), under which the government may take the lands of private persons for public use, and exists in all modern nations, though it varies a good deal, both as to the persons and property which may be taken and as to the circumstances under which it may be exercised. It is deemed an incident of the prerogative, or sovereignty, and is justified by the necessities of the state. As such necessities are, as a rule, urgent and pressing only in time of war or of preparation for war, the practice is almost unknown in the United States, but is freely employed in the countries of Europe and Asia, which are in a constant state of war or warlike preparation. The most conspicuous instance of impressment is the compulsory recruiting of the military and naval forces of those countries whose military system is based on conscription. In other respects also, as in the seizing of railroads, horses, carriages, and other means of transportation in time of war, the practice is common in military states.

Though the military and naval forces of Great Britain are wholly recruited by voluntary enlistment, the practice of impressment for service in the army and navy was formerly in use in England, but has in both cases been discontinued. It is doubtful whether impressment for military service was ever lawful. It was resorted to without statutory authority by an exercise of the royal prerogative, but was abolished by Act of Parliament in 1640 (16 Car. I, c. 28) and has never since been legalized. Impressment of seafaring men for naval service is, however, permitted by statute and was at one time extensively practiced, but is no longer in use, though it might at any time be revived by proclamation. All seafaring men, except masters and mates of merchant vessels, watermen apprentices, and certain other exempted persons, were liable to be forcibly seized, taken on board men-of-war, and compelled to serve. The practice was extended to cover men on board vessels in other than home waters. As the British government claimed a right to the services of her seamen wherever found, men were seized on board foreign merchant vessels, and even on men-of-war which were too weak to resist. Similarity of language and the fact that many American seamen were of British birth caused the United States to be the greatest sufferer from the British press gangs, and eventually this grievance became a leading cause of the War of 1812. It is stated that the number of impressed Americans serving in British ships between the years 1802 and 1812 was seldom less than the total enlisted force of the United States navy at the time, and at the beginning of the war more than 2000 Americans were discharged into prison ships for refusing to fight against their own country. In the treaty of peace Great Britain did not formally give up her claim to the right of impressment as respected seamen in American ships, for the subject was not mentioned; but the claim of the United States was tacitly admitted, and no further attempts were made to impress men from American ships.

Impressment of horses, drivers, vehicles of all kinds, the rolling stock of railroads and of vessels, is, as has been said above, common in continental countries in time of war and may under certain restrictions be employed in Great Britain in accordance with the Army Act, 1881 (44 and 45 Vict., c. 58). The obligation to provide such facilities for the use of the state rests upon all persons enjoying its hospitality, resident or traveling aliens, as well as domiciled citizens. Consult C. M. Clode, *Military Forces* (London, 1869), and William Stubbs, *Constitutional History of England* (3 vols., Oxford, 1887–91).

IMPRIS′ONMENT (from *imprison*, OF., Fr. *emprisonner*, from *en*, in + *prison*, prison, from Lat. *prensio*, arrest, from *prehendere*, *prendere*, to seize). The restraint of a person's liberty for any cause whatever, whether by authority of the government or by a person acting without such authority. In the latter case it is "false imprisonment." Imprisonment does not necessarily imply a place of confinement, with bolts and bars, but may be exercised by any use or display of force, lawfully or unlawfully, wherever displayed, even in the open street. A man becomes a prisoner, wherever he may be, by the mere word or touch of a duly authorized officer directed to that end. Usually, however, imprisonment is understood to imply an actual confinement in a jail or prison employed for the purpose according to the provisions of law. The power to imprison is in many cases inherent in courts or magistrates, and in others conferred upon them by statute, and it may be employed in civil as well as criminal proceedings. Imprisonment for debt, once universal in this country, under the English common law, is now generally abolished by statute, except in cases where the action of the debtor is tainted by fraud, or where he is reasonably suspected of an intention to avoid his debts by concealing his property, or of removing it and himself from the jurisdiction of the court. (See DEBTOR.) Witnesses whose testimony is necessary for the conviction of a criminal may be imprisoned to prevent their escape from the jurisdiction of the court. Persons accused of crime are either confined till the day of trial or released on bail, according to the gravity of the offense with which they are charged. Courts have the power to imprison for contempt of their authority, and persons found guilty of crime are imprisoned for periods prescribed by statute or determined by the judgment of the court.

Imprisonment as a punishment for serious crimes (felonies) is comparatively modern and came into use on the breakdown of the harsh and inhuman penal system of the last century, under which practically all felonies were punishable with death. For minor offenses (misdemeanors) and for contempts imprisonment, usually coupled with a fine or as an alternative to a fine, was permitted at common law, and the length of the sentence was limited only by the discretion of the court. The terms of imprisonment imposed for such offenses were usually short, however, rarely extending to a year, and it was not until by statute imprisonment was substituted for penal servitude and transportation (which were themselves substitutes for the death penalty of the older law) as the punishment for felony, that prisons of the modern type came into being.

Imprisonment is now, in the United States as well as in Europe, the ordinary punishment for all felonies, and either fine or imprisonment or both for most misdemeanors, except when, in cases of willful murder, the penalty of death is prescribed without the alternative of imprisonment. Modern legislation has generally vested in the courts the power to add to imprisonment the further penalty of hard labor during the term imposed, but the courts have no authority to condemn a convict to hard labor except in cases coming clearly within the terms of the statutes to that effect. See Hard Labor.

The earlier statutes prescribing the penalty of imprisonment for crime fixed the term of imprisonment, graduating it according to the gravity of the offense of which the convict was found guilty on the principle of "making the punishment fit the crime." Later a considerable discretion was vested in the court imposing sentence, a maximum and a minimum period being fixed by statute for each crime or class of crimes, leaving it to the court to determine the precise term of imprisonment within the limits so prescribed. More recently, as a result of modern scientific investigation and modern theories of penology, statutes have generally been enacted in America limiting this judicial discretion and requiring the imposition of sentences of imprisonment for an indeterminate period between fixed maximum and minimum limits. Under this system a convict is sentenced to a term, say, of three to 10 years, the actual limit of his imprisonment being determined by a board of parole or other authority, whose decision is based on a consideration of the prisoner's record before conviction as well as on his conduct during the period of his imprisonment. See Indeterminate Sentence; Penology; Prison; Punishment.

A person who wrongfully or illegally deprives another of his liberty may be sued in a civil action for false imprisonment by the person aggrieved, or prosecuted as for a criminal offense. A prisoner claiming to be unlawfully detained is entitled to a writ of habeas corpus to obtain the judgment of a competent court as to the legality of his imprisonment. See False Imprisonment; Habeas Corpus.

IM'PROBA'TION (Lat. *improbatio*, disapproval, from *improbare*, to disapprove, from *in-*, not + *probare*, to approve, from *probus*, good). In Scots law, the title of a proceeding for setting aside a deed or other instrument, which is apparently valid and probative, on the ground of forgery or fraud. It belongs to the class of 'rescissory' actions and is equivalent to the jurisdiction exercised by the courts of equity in England and America in setting aside and canceling legal instruments and in removing clouds on title. See Equity; Fraud; Mistake.

IMPROMP'TU (Lat., in readiness). In music, a short, extemporaneous composition. Also a title given to compositions for pianoforte that have little thematic development. The term was probably first used by Chopin, whose four impromptus are still the most remarkable works of that kind. Schubert's Impromptus, Op. 90 and 142, were entitled so later by the publisher.

IMPROMPTU DE VERSAILLES, ăɴ'-prôɴ'tu' de vâr'sȧ'y', L'. A play by Molière (1663), in which he attacked the critics of his *Ecole des femmes*.

IM'PROPE'RIA (Lat. nom. pl., reproaches). A series of antiphons and responses which are sung in the Catholic church on Good Friday, as a part of the mass of the presanctified. Ever since 1560 Palestrina's famous Improperia have been sung in the Sistine Chapel in Rome.

IM'PROPRIA'TION (from ML. *impropriatio*, from *impropriare*, to impropriate, from Lat. *in*, in + *proprius*, own). A term used in England, signifying the transfer to a layman of the revenues of a benefice to which the cure of souls is annexed, with an obligation to provide for the performance of the spiritual duties attached to the benefice. The spiritual duties are discharged by a clergyman, who is called a vicar, and who receives a certain portion of the emoluments of the living, generally consisting of a part of the glebe land of the parsonage, together with what are called the "small tithes" (i.e.. tithes of hops, potatoes and the like farming products) of the parish. The custom arose upon the dissolution of the monasteries, when the rights which belonged to them were in some cases bestowed upon laymen.

IM'PROVISA'TION (from Lat. *improvisus*, unforeseen, from *in-*, not + *providere*, to foresee, from *pro*, before + *videre*, to see). The art of producing without previous preparation a poem or a musical composition. Oratory, although in its original form it is founded on spontaneous efforts, is not ordinarily considered under the head of improvisation; but poetry and music, while subject to inspiration, are rather dominated by their complexity, and improvisation in these branches represents a peculiar and unusual ability. Poetry and music, like the dance and music, were inseparable in their early history; the Egyptian priests chanted improvised hymns to their deities; while in Greece, the real home of improvisation in antiquity, it was customary for poets to recite impromptu verses to the accompaniment of the lyre. In later Roman times Archias, the friend of Cicero, Publius Syrus, Ovid, and Statius were famous improvisatori. But as in the course of centuries languages grew more compact, and as less license was allowed, improvisation almost died out among civilized nations. Among savage peoples it has always been practiced. From the decline of Rome to the ninth century improvisation as an art was practically unknown. Then, however, came the renaissance, and the troubadours, the trouvères, the minnesingers, and the meistersingers (qq.v.) followed each other in rapid succession. Italy was quick to take advantage of the adaptability of her language, and the courts of Naples, Milan, and Ferrara became poetical centres from which the new art spread throughout the peninsula. In Germany and in France improvisation was soon superseded by careful composition, but in Spain, and especially in Italy, it lingered long. Petrarch, in the twelfth century, gave a great impetus to improvisation, and down to the present day in Italy it has played an important rôle in the imaginative life of the poorer classes. Improvisation is by no means limited to brief poems of a few verses and of simple structure, but is often carried on in complicated metres and to great length. Some of the most famous of the Italian improvisatori have been the Venetian Leoniceno (died 1524); Serafino of Aquila (died 1500); Accolti of Arezzo (sixteenth century); Metastasio (q.v.), who, however, soon abandoned the art; and Tommaso Syrici (died 1836). In Corsica and Sardinia there are many women (improvisatrices) who improvise long memorial poems at funerals. Among the best-known improvisatrices may be mentioned Magdalena Fernandez (died 1800), Signora Mazzei (born c.1800), and Giovannina Milli.

In music improvisation is the art of performing extemporaneously upon an instrument. A given theme or themes may be developed in strict form, or the performer may give himself up to momentary impulses and employ any number of themes in a free fantasia. The former, however, is a great art, and nearly all the masters, notably Bach and Beethoven, excelled in it. To improvise in a given form requires not only an unusual command over the technique, but also a marvelous power of concentration. Undoubtedly the improvisation of a strict fugue is the most difficult task imaginable. Bach was a master of this.

IMPSONITE, ĭmp′son-īt. A solid bitumen, resembling gilsonite (q.v.), which is found in the Impson Valley, Okla. An analysis gave C, 86.57; H, 7.26; N, 1.48; O, 2.00; S, 1.38; Ash, 1.31. See Bitumen; Asphalt.

IM′PULSE (from Lat. *impulsus*, incitement, from *impellere*, to incite, from *in*, in + *pellere*, to drive). The typical motive, or conscious condition of voluntary action. (See Action.) This action is at first unequivocally determined (see Determining Tendency); the organization of the individual is such not only that a given stimulus can bring about merely a given definite movement, but also that this particular movement must necessarily follow without hesitation or reflection. The primitive impulse is thus composed merely of perception of object and perception of movement, with perhaps an affective process; the primitive impulsive action is action upon presentation. After these first movements, however, ideas may play a part in the motive. The developed impulsive action is action upon representation, and the developed impulse is a simultaneous association (see Association of Ideas) of the above-mentioned factors with an idea of own movement, based upon previous experiences, and an idea of the end or result of movement.

The motives to forms of action other than impulsive may all be derived from the impulse. In selective action the motive is a conflict of impulses, some one of which ultimately prevails as actual motive over the potential motives, its rivals. The motives in sensorimotor, ideomotor, automatic, and reflex action are degenerate impulses, i.e., are impulses from which certain of the conscious factors in the fully developed impulse have, through repetition, been lost. The process of the decay of motive may be studied experimentally in the reaction experiment. See Reaction.

It is difficult to give an example of an impulsive action, for the reason that the "impulse" is a scientific abstraction. Its mark, as we have said, is the single determination; and in concrete experience determinations are difficult to demarcate; while it is only approximately that we may speak of a single determination. What is impulsive in one man's consciousness, then, may not be so in another's, and what is impulsive for a man now may not be so under other conditions. The strong swimmer may plunge impulsively, the weak swimmer only after a good deal of hesitancy and indecision. Signing one's name to a deed is the expression of a highly complex determination; yet during a tiresome lecture one may write one's name in the notebook again and again in a purely automatic way.

Bibliography. Schneider, *Der tierische Wille* (Leipzig, 1880); id., *Der menschliche Wille* (Berlin, 1882); Preyer, *Die Seele des Kindes* (Leipzig, 1890); Sully, *Human Mind* (London, 1892); Wundt, *Lectures on Human and Animal Psychology* (New York, 1901); id., *Grundzüge der physiologischen Psychologie* (Leipzig, 1908–11); Titchener, *Text-Book of Psychology* (New York, 1910).

IMPULSE WATER WHEELS. See Water Wheel.

IMPU′RITIES OF WATER. See Water Purification.

IM′PUTA′TION (Lat. *imputatio*, from *imputare*, to ascribe, from *in*, in + *putare*, to think, from *putus*, clear; connected with Lat. *purus*, pure, Skt. *pū*, to purify). One of the common technical terms of Christian theology. It denotes the transference of the *merit*, in a legal sense, of punishment or reward.

The two problems in connection with which the term is used are those offered by the universal prevalence of sin in the world, and by the forgiveness of men, which the New Testament teaches is for Christ's sake. The former problem arose in connection with the Pelagian controversies in the time of Augustine (see Pelagianism; Pelagius; Augustine), the latter in connection with the controversies of the Reformation. Paul's writings show that he held *some* connection between Adam's sin and the sinfulness of all men. (Cf. Rom. v. 12.) Augustine explained it by a theory of realism, that men sinned *in* Adam. By the time of the Reformation realism had disappeared as a living philosophy, and imputation took its place in theology. Calvinism taught that Adam's sin was *imputed* to his posterity, so that they were treated *as if* they had committed it, being held to the consequences of it in the form of disorder of nature and actual sin resulting therefrom. In the course of time several varieties of imputation were distinguished—immediate, the direct imputation of Adam's sin; mediate, the imputation of a corrupt nature which produces sin. In respect to the forgiveness of sinners for Christ's sake, imputation was originally applied by the Church of the Reformation only to Christ's passive obedience, or suffering on the cross; and when this was said to be imputed to us, nothing more was meant than that we are forgiven for Christ's sake. Later, by that scholastic tendency which always dominates in the period of systemization, distinction was made between the passive and the active obedience of Christ or His obedience to the law, and this was also said to be imputed to the sinner in the act of justification.

Modern theology, even when of Calvinistic descent, seeks to emphasize the internal and ethical aspects of the doctrine. The propagation of a sinful nature, instead of being explained by realism and imputation, is explained by the law of heredity. The difference is not so much that evolution has laid aside the story of the fall of Adam as that modern thought demands an explanation of the fact of moral evil which is at once scientific and ethical. The relation of Christ to the race has also been reconstructed. With the tendency to substitute moral-influence views of the atonement for the mechanical conceptions of older theology, the need of a doctrine of the imputation of righteousness has disappeared. Consult: W. G. T. Shedd, *History of Christian Doctrine* (2 vols., New York, 1864); G. B. Stevens, *Christian Doctrine of Salvation* (ib., 1905); W. P. Du Bose, *Soteriology of the New Testament* (ib., 1906); L. G. Broughton, *Salvation and the Old Theology* (ib., 1908). See Atonement.

IMRU'LKAIS. See Amru-'l-kais.

IMUS, ē'mōōs. A town of Luzon, Philippines, in the Province of Cavité, founded in 1795. It lies 8 miles southeast of Cavité, a short distance from Manila Bay. It was formerly the headquarters of the Filipino chief, Aguinaldo. Pop., 1903, 12,912.

INACHUS, ĭn'ȧ-kŭs (Lat., from Gk. Ἴναχος). The Greek name of a river in Argos and also of the god of the river. When Poseidon and Hera disputed about the possession of Argos, and Inachus decided for Hera, Poseidon is said to have dried up the bed of the Inachus, so that no water could flow through it in summer. The name Inachus was ascribed also to the first King of Argos, and leader of the Argives from the mountains to the plains, whence Argos is called Inachian. In the legends this Inachus is especially celebrated as the father of Io (q.v.).

INAGUA, ē-nä'gwȧ, Great and Little. Two of the Bahama Islands, West Indies, situated at the south end of the group (Map: West Indies, D 2). Great Inagua lies about 60 miles northeast of Cuba and occupies an area of over 665 square miles. It is only slightly elevated and is surrounded by reefs. The chief settlement is Matthew Town; pop., 1911, 1106. Little Inagua lies about 10 miles northeast of the larger island and has an area of about 36 square miles and but few inhabitants. Pop. (both islands), 1911, 1343.

INAJA PALM, ĭn-ăj'ȧ (probably from the native name), *Maximiliana regia*. A South American palm, common in the countries near the Amazon. It has a massive stem, 15 to 20 feet high; very long, drooping, pinnate leaves, which are sometimes more than 15 feet long, with leaflets in groups of three, four, or five at intervals along the midrib, from which they stand out in different directions; numerous spadices; large woody spathes; and densely clustered elongate fruit, with tough skin and soft pulp, and hard stony seed. The spathes are used by hunters to cook in, and with water in them they stand in the fire well enough for the purpose. They are also used as baskets, and as cradles by the Indians, who also eat the fruit, which is particularly attractive to monkeys and some kinds of birds. The leaves yield a serviceable fiber that is used by the natives in the manufacture of ropes, hats, etc.

INAMA-STERNEGG, ē-nä'mȧ-stĕr'nĕg, Karl Theodor von (1843–1908). An Austrian economist and statistician, born at Augsburg. Educated at Munich, he became docent there (1867), professor at Innsbruck (1868), and at Prague (1880). In the following year he was made head of the Statistical Bureau in Vienna and professor of the University of Vienna. He was president of the Central Statistical Commission (1884) and in 1891 was named a life member of the Austrian Upper House. An economist of the historical school, he was editor of the *Zeitschrift für Volkswirtschaft, Socialpolitik und Verwaltung* (1892) and of many departmental publications. He wrote: *Verwaltungslehre* (1870); *Die Ausbildung der grossen Grundherrschaften in Deutschland während der Karolingerzeit* (1878); *Deutsche Wirtschaftsgeschichte* (1879–1901); the important *Zur Verfassungsgeschichte der deutschen Salinen im Mittelalter* (1886); *Sallandsstudien* (1889); "Abriss der deutschen Wirtschaftsgeschichte" in Paul's *Grundriss der germanischen Philologie* (1889); *Die persönlichen Verhaltnisse der Wiener Armen* (1889); *Neue Probleme des modernen Kulturlebens* (1908).

IN-AND-IN BREEDING. See Crossbreeding in Man.

IN'ANI'TION. See Starvation.

INARCH'ING. A method of grafting (q.v.).

IN'ARTIC'ULA'TA. See Brachiopoda.

INBREED'ING. See Crossbreeding in Man.

IN'CANDES'CENT ELECTRIC LIGHT. See Electric Lighting.

INCANDESCENT GAS LIGHT. See Gas, Illuminating.

INCANDESCENT LAMPS. See Electric Lighting.

IN'CANTA'TION (Lat. *incantatio*, from *incantare*, to enchant, from *in*, in + *cantare*, frequentative of *canere*, to sing). The employment of song for magical purposes. In consequence of the excitement awakened by rhythmical utterance, verse has from early times been supposed to possess a divine element. Vergil and Horace represent songs as able to bring down from heaven the moon and the stars; and such influence, in these poets only fanciful, was at an earlier period commonly ascribed to sacred verses. It was further believed that both gods and ghosts were placated by song; and it is a universal feature of worship that in all ceremonies chants are employed which have been handed down from antiquity, preserved with scrupulous exactitude, and supposed to exert supernatural effect. In ancient times every function of human life was accompanied with incantations, presumed to be as essential as were the natural means employed. Poetic formulæ, it was supposed, had power to summon and banish demons, to raise and disperse storms, to bestow sunshine and rain, to grant success in war and in love, to inflict and remove disease, to cause crops to grow, wither, or remove from one granary to another, to make cattle breed and bees swarm, to bring success to the fisherman and hunter, and so on indefinitely. Song, when used for magic ends, is often reënforced by appropriate motions and actions and frequently recited by a shaman (medicine man, magician). Thus, among Navahos the rite called the Mountain Chant, primarily intended for the cure of disease, constitutes an elaborate festival of nine days' duration. It is explained by a myth, to which the songs allude. These form sequences, of which the order must not be changed, and among them are prayers of a simple character, which recite the nature of the sickness, entreat that it may be healed, and end with an assertion that the work is accomplished. Similarly, ancient Babylonian formulæ of an exorcistic character, directed against diseases conceived as evil spirits, ordinarily begin with enumerating the effects of the malady or names of the hostile powers, express the desire of the suppliant for recovery, and conclude with an invocation to Heaven and Earth, who are besought to deliver the sufferer. These also were often associated with ritual, for the performance of which directions are given. Of course, with the songs are sometimes employed other agencies, as when in the *Odyssey* the hero, injured by a boar's tusk, has his hurt bound by the sons of Autolycus, who then proceed to employ an incantation supposed to stanch the wound. In process of time the ceremonies employed in such cases fell into disuse, and the words of such charms became half intelligible or altogether meaningless. It seems to have been always usual that the miraculous healer should recite his rhymes in a low tone of voice, in such a manner as to be unintelligible to spectators, whose sense of mystery was thereby heightened. Considering the tenacity of tradition, it might be expected that some of these formulæ should have a long history. For instance, a German incantation recorded in the tenth century, and evidently of heathen origin, relates that, while certain deities were riding in the forest, a horse dislocated his leg, which the gods wished to heal; Woden was successful by means of an incantation. A similar charm at a later time appears in Christian form, Peter and John replacing the deities, and Christ taking the place of Woden as the healer. In the nineteenth century a form of this incantation was still in use in Shetland, but accompanied by an elaborate ceremony, every part of which was regarded as essential, and which included the use of a thread spun from black wool and having nine knots wound about the sprained part. At the present day the custom remains in force among simple peoples. In English nursery lore the habit of incantation survives in some simple rhymes of children and young people, as, e.g., in verses directed against rain, or those addressed to the moon and stars in order to obtain auguries as to the future mate. Consult the authorities referred to under Magic; also Grendon, "The Anglo-Saxon Charms," in *Journal of American Folk-Lore*, vol. xxii (Boston, 1909).

IN'CAPAC'ITY. In law, the state or condition of being incapable of incurring a civil or criminal liability. Incapacity to contract may be due to the infancy of a party, to his political or professional status, to lunacy or drunkenness, in the case of a woman to coverture, and in the case of a corporation to its artificial construction. A contract entered into by a person under such a disability may, as in the case of an infant, be merely voidable at his election, or, as in the case of a married woman at common law, absolutely void. The disability of coverture has, however, been almost wholly removed by statute, both in England and the United States, and the same is true of some of the disabilities resulting from professional or political status, as in the case of alienage; but the other grounds of incapacity, which are based not on an artificial status but on natural conditions, are still generally observed. See Contract; Coverture; Infant.

In criminal law children under the age of seven are conclusively presumed to be incapable of committing crimes of any nature, and boys under 14 are deemed incapable of sexual crime. See Crime. For incapacity to contract marriage, see Marriage; Impotency; Prohibited Degrees; Consent, Age, in Law; and, on the general subject, Person.

IN'CARNA'TION (ML. *incarnatio*, from Lat. *incarnari*, to be made flesh, from *in*, in + *caro*, flesh, Gk. *κρέας*, *kreas*, AS. *hrāw*, Skt. *kravya*, raw flesh). In Christian theology, the assumption of humanity, by the second person of the divine Trinity, by which He was both God and man in one person. The idea of the appearance of gods in human form is very frequent in primitive religions, in many of which the line between divine and human is not sharply drawn. In more developed religions the idea is often found, both in the belief that certain living men, often kings or saints, are divine incarnations, and in mythological stories of the incarnation of the gods. India and Egypt were specially rich in both these forms of incarnation in beasts as well as men. The Christian doctrine of incarnation differs from these in being ethical rather than physical in emphasis, conceived as occurring once only in the history of the world and for the purpose of the redemption of mankind. The proof of the incarnation of Christ lies, not in the story of the Virgin birth, which cannot be shown to be known by any New Testament writers except the authors of Matthew and Luke, but rather in Christ's harmony with the will of God. For all purposes of modern thought, absolute union of will with the will of God is the incarnation of God. Early speculations about the incarnation, however, were concerned with questions of substance—whether Christ was of the same substance with God. (See Homoousion.) The mediæval theology laid great stress on the incarnation as furnishing the basis for an explanation of the atonement. Anselm (q.v.), in *Cur Deus Homo*, argues that an incarnation is necessary for atonement. Man has incurred the debt for sin, and man must pay it; but man cannot. Therefore the need of a God-man, who is almighty and sinless and can pay the debt, not only for himself but for all men. Modern theology still regards the incarnation as the central doctrine of Christianity, though not for the mechanical reasons of Anselm's theory. The incarnation is now interpreted rather as a revelation of the nature and character of God. Would men know what God is? God is like Christ. Christ's character is the model on which men who wish to be in harmony with God must build. The incarnation is necessary to the revelation of God, for only through a person could the character of a personal God be shown. The incarnation, then, is a necessity for the salvation of men, for it gives them a perfect example of what God requires for harmony with himself.

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IN'CAS. See Peruvian Archæology.

INCE, William (fl. eighteenth century). An English furniture designer, whose chairs represented a transition from those of Chippendale (q.v.), which they most resembled, to Hepplewhite's (q.v.). Ince was most successful in some of his light boudoir furniture. Various details introduced by him set a style for several years. With Thomas Mayhew, for many years his partner in London, he published *The Universal System of Household Furniture* (c.1762), whose 95 plates show more than 300 "designs in the most elegant taste." Consult, besides this work, the references cited under Chippendale Chairs and Furniture.

INCE-IN-MAKERFIELD, ĭns′ĭn-măk′ẽr-fēld. A town in Lancashire, England, 1 mile east-southeast of Wigan, on the Leeds and Liverpool Canal (Map: England, D 3). It has railway-wagon works, ironworks, blast furnaces, cotton works, and extensive coal mining. The town has owned its water works since 1871. Pop., 1901, 21,262; 1911, 22,034.

INCEN′DIARISM. See Arson.

IN′CENSE (from OF., Fr. *encens*, Lat. *incensum*, incense, from *incendere*, to burn, from *in*, in + *candere*, to glow, connected with Gk. *καθαρός*, *katharos*, pure, Skt. *śoandra*, *oandra*, shining, noon, from *śand*, to be bright). A perfume the odor of which is evolved by burning. It was used in worship in Egypt, Babylonia, and Assyria, Persia, Greece, and Rome, in the later Hebrew religion, in Hinduism and Buddhism. In the Christian Church there is no positive evidence of its use during the first four centuries. The earliest authentic reference to it is in the Pseudo-Dionysius in the fifth century. In the Catholic church, both of the West and of the East, incense is used in public worship, in the solemn (or high) mass, in the consecration of churches, in solemn consecrations of objects intended for use in public worship and in the burial of the dead. The incense at present in use consists of some resinous base, such as gum olibanum, mingled with odoriferous gums, balsams, etc. There is no regular formula for it, almost every maker having his own peculiar recipe. The ingredients are usually olibanum, benzoin, styrax, and powdered cascarilla bark. These materials, well mingled, are so placed in the censer (q.v.) or thurible as to fall by sprinkling on hot charcoal, which immediately volatilizes them. In the reformed churches the use of incense was abandoned, but has been restored to some extent in the High Church branch of the Anglican communion; and the Catholic Apostolic (or Irvingite) church (q.v.) has always used it. Consult: Atchley, *History of the Use of Incense in Divine Worship* (London, 1909).

INCEP′TION. See Act or Ceremony of Inception.

IN′CEST (OF., Fr. *inceste*, from Lat. *incestum*, incest, neut. sing. of *incestus*, unchaste, from *in-*, not + *castus*, chaste). Sexual intercourse between persons who are legally prohibited from marrying because of their affinity or consanguinity (q.v.). Incest is not a common-law offense, but in England is punishable in the ecclesiastical courts by excommunication and penance. It is said to be the only form of immorality which, in the case of the laity, is still punished by the ecclesiastical courts on the general ground of its sinfulness.

In the law of Scotland incest is a high crime by a statute (Scots Act, 1567, c. 14) which defines it by a reference to Leviticus (chap. xviii), and was till 1887 punishable with death. Incestuous marriages are absolutely void both in England and the United States.

In most of the American States incest is a criminal offense by statute, punishable by imprisonment for a term of years, usually not exceeding 10. In some States the marriage of persons within the prohibited degrees, even when not followed by cohabitation or accompanied by sexual intercourse, amounts to criminal incest. Consult: Blackstone, *Commentaries on the Laws of England* (1st ed., 4 vols., London, 1765–69); Stephen, *History of the Criminal Law of England* (ib., 1883); Phillimore, *Ecclesiastical Law* (2d ed., 2 vols., London, 1895); Bishop, *Statutory Crimes* (Chicago, 1901); Slater, *Manual of Moral Theology* (New York, 1908). See Consanguinity; Marriage; Prohibited Degrees.

INCH. See Weights and Measures.

INCH, James Robert (1835–1912). A Canadian educator, born at Petersville, Queen's Co., New Brunswick, and educated at Mount Allison University. He was principal of the Mount Allison Ladies' College (1864–78); president of the University of New Brunswick (1878–91); superintendent of education and president of New Brunswick University, the two offices having been amalgamated by act of the Provincial Legislature. In 1895 he was elected vice president of the Dominion Educational Association; in 1906 he was made a member of the committee on union of the Presbyterian, Methodist, and Congregational churches of Canada, and in 1907 he was a delegate to the Imperial Educational Conference at London, England. He resigned as superintendent of education in 1909.

INCH′BALD, Elizabeth Simpson (1753–1821). An English novelist, playwright, and actress, born at Stanningfield, near Bury St. Edmund's, Suffolk. She educated herself, mostly by general reading. After vain attempts to engage herself as actress, both in Norfolk and in London, she married, in 1772, the actor Joseph Inchbald. Later in the same year she made her first appearance on the stage at Bristol in the rôle of Cordelia. With her husband she performed in the provincial towns till his death (1779) and continued to appear for 10 years more. As an actress, she had the advantage of great personal charm, but an impediment in speech prevented the highest success. Beginning to write for the stage as early as 1782, she produced about 20 comedies and farces, which were well received at the London theatres. But of her literary work only her two novels have survived: *A Simple Story* (1791; with introd. by G. L. Strachey, Oxford, 1908), which, though ill constructed, did not lack real merit; and *Nature and Art* (1796), which was very popular. Mrs. Inchbald also edited three collections of plays: *The British Theatre* (25 vols., 1806–09); *Modern Theatre* (10 vols., 1809); and *Farces* (7 vols., 1809). She wrote her memoirs, but destroyed them. Consult: Scott's edition of her *Novels* with a memoir (London, 1880); Boaden, *Memoir* (ib., 1833); Elwood, *Memoirs of the Literary Ladies of England* (ib., 1842); J. Fyvie, *Tragedy Queens of the Georgian Era* (New York, 1909).

INCH′CAPE ROCK, The. A ballad by Southey relating how the bell buoy on the reef of this name (see Bell Rock) near Arbroath (q.v.), Scotland, was destroyed by a pirate and how he afterward lost his own life on the spot.

INCH′COLM, or **Island of Columba.** A picturesque islet in the Firth of Forth, in the Parish of Aberdour (q.v.), Fifeshire, Scotland, separated from the Fife shore by Mortimer's Deep, a channel about a mile wide. It is half a mile long, with a maximum width of one-third of a mile, and is noted for its monastic ruins, which exhibit traces of the twelfth-century Romanesque architecture, but are chiefly in the early Pointed style of the thirteenth and fourteenth centuries. They consist of the remains of an abbey of Austin Canons regular, founded by Alexander I in 1123, and include a vaulted oratory, and a chapter house with groined roof and three elegant sedilia. The Latin names of the islet are Æmona and Insula Sancti Columbæ, the latter derived from St. Colm, or Columba (q.v.), of Iona, who dwelt here in the sixth century. As St. Colm's Inch, it is mentioned in Shakespeare's *Macbeth,* Act i, Scene 2. The monastery was frequently sacked by the English during the fourteenth, fifteenth, and sixteenth centuries. Consult Simpson, *Æmona and the Islands of the Forth* (Edinburgh, 1861).

INCHKEITH, inch′kêth. A small fortified island of historic interest in the Firth of Forth, Scotland, nearly midway between Leith and Kinghorn. It has a lighthouse, 220 feet above high water, visible 21 miles.

INCH′WORM′. See Measuring Worm.

IN′CIDENT (from Lat. *incidere,* to fall upon, from *in,* in + *cadere,* to fall). In law, a right, privilege, or burden inseparably annexed to an estate or tenure of lands. Thus, rent reserved upon a lease for life or years is incident to the reversion, or estate of the landlord, and passes with the latter upon its assignment; and a right to distrain is incident to a rent charge and attends it into whosesoever hands it may come; and a court baron is incident to a manor (q.v.), which, indeed, cannot exist without such a court. In the same sense the rights of inheritance, of free alienation, and of escheat are incidents of an estate in fee simple, and the right to take estovers (see Estover) is an incident of a tenancy for life or years, while dower and curtesy are among the incidents of estates of inheritance.

More specifically the term "incident" is employed in English law to describe a certain class of obligations attaching to the several forms of feudal tenure. Viewed from the standpoint of the lord of whom the lands were held, these were certain legally defined rights which inured to him by virtue of his superior or paramount title. They were due, as a matter of legal obligation, from all land held by such tenure, and not by virtue of any understanding or agreement—which fact distinguishes them from the *services* due from the tenant to the lord, which were entirely a matter of agreement.

The most important of these "feudal incidents," as they are termed, were *aids, reliefs,* and *escheats,* which were due from all secular tenures, and *wardship* and *marriage,* which were peculiar to the military tenures. These will be described under their appropriate titles. Though differing greatly in the kind and amount of the burden which they imposed upon the land, they had this in common, that they came to be regarded as the essential and distinguishing characteristics of the several forms of tenure to which they were appropriate. The military structure of the feudal system in England decayed rapidly after the Conquest, and the expression "military tenure," or "tenure in chivalry," was regarded not as tenure for which military service was in fact to be rendered, but tenure attended by the burdensome incidents of wardship and marriage; while socage tenure was not so much a tenure by a fixed and determinate service as one free from those incidents.

Most of the incidents of tenure were done away with by the famous statute which abolished military tenures (12 Car. II, c. 14), and only the right of escheat remains to remind us of the feudal origin of our land law. See Feudalism; Socage; Tenure; and the authorities there referred to.

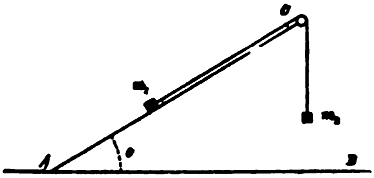
IN′CIDEN′TAL MUSIC. By this term is meant all music written specially for the purpose of illustrating or intensifying certain moments of a spoken drama, such as fanfares, marches, dances, serenades, songs, etc., which are performed while the action is in actual progress upon the stage. Music played between the acts, even if it has some connection with the drama, does not come under this definition, but is classed as entr'acte music. Nor are concert overtures, inspired by a drama and portraying some mood or character, included. Such examples as Wagner's *Faust Overture,* Schumann's *Braut von Messina,* Goldmark's *Prometheus,* etc., come under the heading of programme music. They were not written for performance in connection with those dramas. On the other hand, such overtures as Beethoven's *Egmont,* Mendelssohn's *Midsummer-Night's Dream,* Schumann's *Manfred,* though frequently performed at symphony concerts, constitute part of the incidental music written for those dramas. From the scenic directions found in his plays it is evident that Shakespeare relied extensively upon the aid of music; but, strange to say, not a note of the original incidental music has come down to us. When Henry Irving assumed the management of the Lyceum Theatre in London (1878), he inaugurated the practice of staging every Shakespearean play, and almost every modern drama of importance, with new incidental music written for the occasion by the foremost English composers.

IN′CINERA′TION. See Cremation.

INCINERATION, Refuse. See Garbage and Refuse, Disposal of; Field Cooking.

IN′CLINA′TION, Magnetic, or Dip. The angle made with the horizon by the axis of a magnetic needle which swings freely in a vertical plane passing through the magnetic meridian (compass direction). It varies from point to point on the earth's surface, ranging from 90° at the magnetic poles to zero at the magnetic equator. The varying amount of magnetic inclination will be found indicated on the isoclinic charts accompanying the article Terrestrial Magnetism. The magnetic inclination was first definitely discovered by Robert Norman in 1576, and an instrument, the dip circle, was devised by him for measuring the amount. The phenomenon had previously been noticed by George Hartmann, in Nuremberg, as would appear from a letter written in 1544, but he failed to measure the amount of inclination accurately; he merely observed the dip of a compass needle which was not quite balanced. It should be carefully noted that the magnetic inclination, as above defined, is the *minimum* angle which a dip needle makes with the horizon at any given place. Thus, if the plane in which the dip needle swings is set at right angles to the magnetic meridian, then the angle of dip will be the maximum amount possible, viz., 90°; it is with the aid of this fact, indeed, that the vertical plane of the dip circle is frequently set in the magnetic meridian. Besides the dip circle an instrument known as the earth inductor is used to measure the dip. The magnetic inclination is subject to periodic and aperiodic variations, as is the magnetic declination. In order that an ordinary compass needle may swing in a horizontal plane, it is customary in northern latitudes to make the southern end of the needle slightly heavier; or the same effect is secured by using a symmetrical needle which has been weighted with a small bit of brass on its southern half. See Compass; Declination; Declinometer; Dip Circle; Dip of the Magnetic Needle; Isoclinic; Magnetism; Terrestrial Magnetism.

INCLINED PLANE. A smooth plane inclined to the horizontal plane at any point on the earth's surface. Imagine a plane section through this inclined plane and the horizontal one, perpendicular to their line of intersection. Let the plane be supported by an upright; and let two bodies of masses m_1 and m_2, joined by an inextensible string, be placed, as shown, one on the plane and one hanging freely, the string passing over a pulley. If the bodies are in equilibrium, the forces on the body of mass m_1, parallel to the plane, must balance each other. There is a force $m_1g\sin\theta$ down the plane and a force m_2g up the plane; hence $m_1g\sin\theta = m_2g$; or, in general, the force up the plane equals the weight of the body on the plane multiplied by the sine of the angle of inclination of the plane. To produce motion up the plane of a heavy body requires therefore less force than its weight. The "mechanical advantage" is $\frac{1}{\sin\theta}$.



INCLINED PLANE.

Another method for solving this problem is to consider as before the two bodies in equilibrium and to produce a small displacement; let the body whose mass is m_1 move up the plane a distance x_1, and the body whose mass is m_2 move vertically down, owing to this, a distance x_2. By the principle of energy $m_1g\sin\theta x_1 = m_2gx_2$; but $x_1 = x_2$; hence, as before, $m_1g\sin\theta = m_2g$. Inclined planes are still used daily for rolling up heavy weights. They were used by all ancient peoples for raising heavy stones for building purposes. The screw is nothing but an inclined plane rolled around a cylinder.

INCLINOMETER. A term applied to an instrument for determining the inclination of the magnetic needle, more properly known as a dip circle (q.v.). See Inclination; Terrestrial Magnetism.

INCLOSED ARC LAMP. See Electric Lighting.

INCLO′SURE OF COMMONS. In English law, the freeing of wastes and common lands from certain common, or community, rights of user to which they may be subject. Commons, i.e., rights of common—as the right of villagers or the tenants of a manor to pasture their cattle on the waste land of the vill or manor—are among the oldest of English property rights. They were formerly very common and were doubtless a survival of primitive forms of community property, antedating the institution of private ownership. When, with the advent of the feudal system, the lands came to be regarded as the private property of greater or lesser lords, the accustomed use of the lands for pasturing cattle, cutting turf, and the like, survived as common, customary rights of the community exercising them. As such privileged use of the land prevented its conversion to ordinary agricultural purposes, it was necessary to extinguish the common rights before this could be effected. The process by which this was accomplished was the inclosure of the commons.

At common law the only method by which the right to inclose lands subject to common rights could be gained was by mutual agreement between all who had commonable privileges therein—a tedious and unsatisfactory method. The benefits of inclosure became evident centuries ago, and as early as the reign of Henry III a general act of Parliament, known as the Statute of Merton (1235, 20 Hen. III, c. 4), was passed, authorizing the "inclosure and approvement" of commons of pasture upon certain conditions. This was followed just half a century later by the Statute of Westminster II (13 Edw. I, st. i, c. 46), which gave greater precision to the methods by which inclosure should be effected. But the transformation of English agriculture was a slow process, and 500 years more were to elapse before the common rights in waste land became a serious obstacle to the economic development of the country. In 1801 the first general Inclosure Act was passed, and this was followed by the Inclosure Act of 1845, by which, with its amendments, the inclosure of commons and wastes is now regulated. All of this legislation has aimed at facilitating the division of commons, their conversion into separate and independent land holdings, the inclosure of such holdings, and the improvement of those portions that are retained for the common use of towns or villages. Consult: Elton, *Treatise on the Law of Copyholds and Customary Tenures of Land* (London, 1874); Williams, *Rights of Common* (ib., 1880); Scrutton, *Commons and Common Fields* (ib., 1887); Gonner, *Common Land and Inclosure* (New York, 1912). See Common.

IN CŒ′NA DOM′INI (Lat., at the Supper of the Lord). A celebrated papal bull, so called because designed to be read in the church of St. Peter's at Rome on every Holy Thursday, the day on which the Lord's Supper was instituted. It is not, as other bulls, the work of a single pope, but, with various additions and modifications, dates back to early times; some tracing it to Urban V, and others to Martin V, Clement V, and some to Boniface VIII. Its present form, however, it received from the popes Julius II, Paul III, and finally Urban VIII, in 1627, after which it continued for a century and a half to be published annually. Pius V, in 1568, decreed that it should be read every Holy Thursday until superseded. The contents of this bull have been a fertile subject of controversy. It may be briefly described as a summary of ecclesiastical censures, especially of those with which grievous violation of the faith of the Church, or of the rights of the Church or of the Roman see, are visited; excommunication being denounced against heresy, schism, sacrilege, usurpation of the rights of the Church or of the Pope, forcible and unlawful seizure of Church property, personal violence against ecclesiastics, unlawful interruption of the free intercourse of the faithful with Rome, the invasion of the Pontifical States, etc.—20 clauses in all. The bull, however, although mainly dealing with offenses against the Church, also denounced under similar censures other crimes, as piracy, plunder of shipwrecked goods, forgery, etc. This bull, being regarded by most of the sovereigns of Europe as an infringement of their rights, encountered in the seventeenth century the determined opposition of nearly all the courts, even the most Catholic; and at length, in 1770, Clement XIV discontinued its publication, which has never since been renewed. Pius IX, on Oct. 12, 1869, abrogated it and issued a new constitution, *Apostolicæ Sedis*, in its place.

IN'COMBUS'TIBLE FABRICS. Much attention has been paid to the production of incombustible fabrics, and of solutions which may be applied to any fabrics to render them more or less fireproof. As typical of the first may be mentioned asbestos cloth when this fibre is used either wholly or in part to form the fabric. A drop curtain of such material at the proscenium arch is required for theatres in many cities. It is usually made of metallic asbestos cloth where a strand of asbestos yarn is wound with a strand of fine brass wire and the combination woven into a cloth usually of 36 inches width. While useful, these asbestos curtains have their limitations and fire engineers urge that too much dependence should not be placed upon them. Many salts possess the power of rendering fabrics which were immersed in solution of them incombustible; but some of these injure the fabric, spoil the color, or are so very expensive as to render their general use impossible. Three, however, viz., tungstate of soda, phosphate of ammonia, and sulphate of ammonia, produce the best results without injuring the fabric or color. The first of these acts physically by preventing contact with the air and does not interfere with the process of ironing and starching; it is therefore preferable for goods requiring washing. For fabrics which are used without previous washing, the other two are preferable. Soluble glass (silicate of soda) is a highly alkaline solution of minerals composing glass which is applied to textures, in theatres especially for curtains and scenery, to render them fireproof. Fire touching them melts the invisible minerals into a glaze which excludes air and prevents combustion. All these solutions, however, are likely to lose their efficiency if some time has elapsed since they were applied. Consult: British Fire Prevention Committee's *Red Books*, especially no. 129, "Fire Tests with Textiles" (1908), and no. 148 (1910); also *Journal of British Fire Prevention Committee*, "Fire Prevention in Paris," no. 8 (1912); various papers in the files of the *Quarterly of the National Fire Protection Association* (Boston, current), especially vol. vi, no. 2 (1902), "Fireproofing Cotton Goods." For further treatment of the subject, see FIREPROOFING.

IN'COME TAX. A tax upon the income of individuals. It may be levied directly upon the individuals receiving the income, or it may be collected from the income at its source in the form of a tax upon dividends, interest on bonds, etc. It may be uniform, taxing all incomes at a uniform rate, or progressive, increasing the rate of taxation with the amount of income received by the individual. An income tax may differentiate between various forms of income, as, e.g., between incomes from labor and incomes from property, or between permanent and temporary incomes. Differentiation may be attained either by levying a higher rate upon some forms of income than upon others, or by the imposition of a supplementary tax upon property or upon consumption which will in effect fall upon the incomes discriminated against.

In states which levy an income tax it is usually the practice to exempt small incomes, or that portion of the income necessary to mere independent existence or to the maintenance of the usual standard of life, and to levy the tax only upon the excess. The theory of such exemption is that the state should not take from the individual in the form of taxes what it will be obliged to return to him in the form of poor relief or otherwise.

In theory the income tax, more nearly than any other system, meets the requirements laid down in the most advanced canons of taxation. A man should be taxed according to his ability, or "faculty"; and income is the best test of ability. A graduated tax on incomes is popularly defended on the ground that it may be employed to bring about a more equal distribution of wealth. In the latest financial theory, however, graduated taxation is justified on the ground that a man's ability to pay taxes increases more rapidly than his income. Differentiation of taxation is advocated on similar grounds. One who receives an income from permanent property is in a more favorable position than one who receives an equal income from labor, since the latter is compelled to make provision against unemployment, while the income of the former is quite at his disposal. It is, therefore, in accordance with the faculty test that incomes from property should pay a higher rate than incomes from labor.

In practice it is found to be difficult to determine directly the magnitude of a man's income. This is especially true in countries like America and England, where it is the policy of government to interfere as little as possible in the business affairs of the individual. This difficulty is greatly reduced when the tax is levied, not directly upon the individual, but upon the source of the income. Under this system corporations may be required to withhold a part of the dividends for the payment of the tax as well as a part of the salary of employees. When the tax is levied at the source, however, it is difficult to graduate it so as to tax those who receive large incomes at a higher rate than those whose incomes are small.

The income tax was introduced in England as a purely fiscal expedient. The huge expenditure of the Napoleonic wars forced the adoption in 1799 of an income tax, which with a short intermission lasted till the close of the war. It was again revived in 1842, and, although in 1874 an attempt was made by Gladstone to secure the repeal of the tax, it has maintained its position to this day as an integral part of the British financial structure. The British income tax is levied on the source of the income and does not attempt to provide for graduation or differentiation. It has proved to be a very productive tax; and by changing the rate the government is enabled to increase or diminish its revenue so as to cover exactly fiscal needs. In Italy the income tax was introduced by the law of 1864 (amended in 1877), and the fiscal needs of France after the Franco-Prussian War forced it also to adopt a national tax upon the income of corporations and associations. By a law of 1891 Prussia introduced a direct tax upon incomes. The tax was graduated, but at first made no provision for differentiation. In 1893 an auxiliary tax was levied upon property, thus establishing differentiation in effect. In 1893 Holland adopted an income-tax law which provided both for graduation and differentiation. By this law corporations as well as individuals are subject to the tax, but the holders of corporate securities pay no additional income tax on the revenue from them. A similar law was introduced in New Zealand in 1893. Switzerland, Denmark, and Austria levy income taxes, as does also Australia.

In the United States an income tax was advocated during the War of 1812 by Secretary Dallas, and in 1862 such a tax was actually adopted, and remained in force until 1872, despite the opposition of the propertied classes. No satisfactory machinery was established for its application. Individuals were required to submit estimates of their incomes; and as there was no means of verifying these estimates, the tax was paid only by those who were scrupulous enough to admit that their incomes exceeded the untaxed minimum. In spite of the great increase in national wealth, the receipts from the income tax declined from year to year. In 1894 the income tax was again introduced as a part of the Wilson Tariff Bill, and was carried largely by the Western and Southern members, despite violent opposition from the cities of the East. The tax, however, was declared unconstitutional (May 20, 1894), because, although a direct tax, it was not apportioned among the States according to population.

On July 12, 1909, an amendment to the Constitution giving Congress power "to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration," was submitted to the States by Congress. On Feb. 25, 1913, the amendment was declared adopted, the necessary two-thirds of the States having ratified it. Under its authority a law taxing incomes was incorporated in the Tariff Act of Oct. 3, 1913. Under this law every single person with an income above $3000 is required to pay a normal tax of 1 per cent on the excess above such sum; every married person is required to pay a normal tax of 1 per cent on the excess of income above $4000. An additional tax of 1 per cent is levied upon income in excess of $20,000 and not above $50,000; an additional tax of 2 per cent on income in excess of $50,000 and under $75,000; 3 per cent on income in excess of $75,000 and under $100,000; 4 per cent on income in excess of $100,000 and under $250,000; 5 per cent on income in excess of $250,000 and under $500,000; and 6 per cent on income above $500,000. The principle of deduction at the source is employed extensively, in the case of incomes from corporate salaries, investments, etc.

Income taxes have been imposed at various times in 21 States, and in 8 States such taxes are still in force; but in no case have they been productive of large revenue. The Income Tax Law of Massachusetts dates from Colonial times and exempts incomes under $2000 as well as income derived from property already taxed. Consult: Hill, *The British Income Tax* (New York, 1889); Müller, *Die Einkommenbesteuerung in den verschiedenen Ländern* (Halle, 1902); Kinsman, *The Income Tax in the Commonwealths of the United States* (New York, 1903); Caillaux, *L'Impôt sur le revenu* (Paris, 1910); Kennan, *Income Taxation* (Milwaukee, 1910); Seligman, *The Income Tax* (New York, 1911); Bankers Trust Company, New York, *Federal Income Tax* (ib., 1913); id., *Federal Income Tax Regulations and Law, with United States Treasury Department Rulings* (ib., 1913); id., *United States Internal Revenue Regulations Relating to Deduction of Federal Income Tax at the Source, as Issued October 25, 31, December 4–16, 1913; December 20, 1913–January 3, 1914* (ib., 1913–14); H. C. Black, *Treatise on the Law of Income Taxation under Federal and State Laws* (Kansas City, 1913); L. F. Speer, *Federal Income Tax Law Affecting Individuals and Corporations, with an Analysis of the Act and Explanatory Notes* (New York, 1913); Cordell Hull, *Federal Income Tax Law, together with Synopsis of the Law* (ib., 1914); Roger Foster, *Treatise on the Federal Income Tax under the Act of 1913* (Rochester, N. Y., 1914); Foote and Tracewell, *Analysis and Interpretation of the Federal Income Tax Law* (Washington, 1914); A. H. Walker, *The Unconstitutional Character and the Illegal Administration of the Income Tax Law Demonstrated* (New York, 1914). See FINANCE; TAXATION.

IN'COMMEN'SURABLE. See COMMENSURABLE.

INCONNU, ăɴ'kô'nụ' (Fr., unknown). A fish, usually called the Mackenzie River salmon (*Stenodus mackenzii*), which is intermediate between salmon and whitefish, and weighs about 10 pounds, though sometimes it is much larger. It ascends all the rivers of Arctic America and Asia and is of much importance to the natives of their valleys, though the fish is oily. It was discovered by Alexander Mackenzie, whose followers named it.

INCONSTANT, THE; OR, THE WAY TO WIN HIM. A comedy by George Farquhar (1702), adapted from Fletcher's *Wild Goose Chase*.

INCOR'PORAT'ED SOCIETY OF AUTHORS, THE. A society organized in London, in 1884, by Sir Walter Besant, for the protection of authors and composers, and modeled on La Société des Gens de Lettres of Paris. Its purpose is to maintain the rights of authors, to advise them as to questions of copyright, to assist them in making contracts with publishers and in recovering money due under contracts. The society has also vigorously advocated amendments to the copyright law and had a large share in amending the laws of Canada and other colonies of the British Empire. The official organ is the *Author*, which is published monthly from the society's office. The society maintains a pension fund for the assistance of poor and unfortunate authors. The first president of the society was Lord Tennyson. The president in 1914 was Thomas Hardy.

INCOR'PORA'TION. The legal process by which a corporation is formed. As incorporation involves the creation of a new, artificial person, endowed by law with many of the rights of a natural person—as the power of holding and alienating property, the right of transmitting real estate by succession, the capacity of suing and of being sued as an individual, etc.—it is the exclusive privilege of the sovereign power. In England it is included in the royal prerogative, and the exercise of this power of the crown is known as a franchise (q.v.). In modern times it has come under the control of Parliament, and incorporation may be effected either by a special act or, more generally, under general statutes. In the United States the power to create corporations has never been a prerogative of the President or of the Governor of a State, but is vested exclusively in Congress and in the legislatures of the several States.

Thus, incorporation may be effected by royal grant or charter, by special act of parliament, or a legislature, or by compliance with general statutes providing for incorporation for defined purposes and under defined conditions. The usual method employed in the United States at the present time is the last named, and the process is of the simplest character, consisting usually in the filing, with the Secretary of State, or other proper authority, of a duly executed certificate of incorporation, setting forth the name and objects of the proposed corporation, the area within which it proposes to carry on its operations, the names of the incorporators, the names of the directors for the first year, and the location of its principal place of business. Such certificate constitutes the charter of the corporation so created. In the issue of this charter the chief executive in some States has a wide authority, and in a few, as in Pennsylvania, the chief executive, on the advice of the Attorney-General, decides, subject to judicial revision, whether a given petition for a charter falls, in certain cases, within the general statute. In others, this power vests in the courts directly. Where incorporation is effected by special legislative act or by royal grant, the statute or grant creating it is itself the charter of the corporation.

The effect of the act of incorporation is to create the rights and liabilities which the law attaches to the form of corporation so created, so that future acts relating to the corporate body may affect that as a distinct legal entity instead of the individual by whom the corporation is represented or the individuals included in its membership. For a treatment of the various classes of corporations and the specific acts necessary to their creation, see Corporation; Charter; and the authorities there referred to.

IN'CORPO'REAL (from Lat. *incorporeus*, bodiless, from *in-*, not + *corporeus*, bodily, from *corpus*, body). In the common-law classification of real property, an estate, or interest, which is not accompanied by seisin, or possession. Present estates in land, such as freeholds and leaseholds in possession, are identified with the land itself, and are described as *corporeal*, i.e., as something substantial and tangible; while corresponding interests not in possession, such as future estates and rights in the land of others, are regarded as being of an unsubstantial and intangible nature and are accordingly described as *incorporeal*. The distinction has no scientific value, as the idea connoted by the terms "property" and "ownership" is always that of a legal right, and rights are always bodiless things and are equally immaterial and insubstantial, whether they relate to present or future enjoyment of land, and, indeed, whether they have to do with things or persons. But the distinction is a convenient one, nevertheless, and has had an important influence on the development of property law.

In our legal system the classification of property as corporeal and incorporeal is confined to interests in land. Though future interests in chattels and such property as shares of stock, patent rights, and copyrights are sometimes described as incorporeal, and though such eminent legal authorities as Sir Matthew Hale and Blackstone apply the term "corporeal" to jewels and other personal chattels, the distinction is of no value or importance in the law of personal property. On the other hand, the usual limitation of the terms "corporeal" and "incorporeal" to hereditaments, i.e., to such interests as descend to the heir of the owner upon his death, is too narrow, as a future leasehold estate, or an easement or profit *à prendre* (qq.v.) for a term of years, which passes, like other personal property, to the executor or administrator, is equally entitled to be described as incorporeal.

It was in the methods of conveyance employed in creating or transferring the two kinds of property that the distinction between them attained its principal importance. Corporeal interests being susceptible of seisin, of possession, were said to "lie in livery," i.e., to be capable of transfer by the method of livery of seisin, or delivery of possession; whereas the more intangible incorporeal property, not being susceptible of physical transfer, was said to "lie in grant," i.e., to be transferable only by the form of deed known as a grant (q.v.). With the abolition of conveyance by livery of seisin and the general adoption of the method of conveyance by deed for all kinds of property, corporeal and incorporeal, the distinction has almost wholly lost its importance. See Hereditament; Real Property.

IN'CREMENT, The Unearned. See Single Tax.

INCROYABLES, ăɴ'kwrä'yȧ'bl' (Fr., incredibles). A name applied to the Parisian dandies under the Directory, who made themselves conspicuous by their extravagance in dress, manner, and speech. One of their peculiarities was the omission of *r* in speaking, and they got their name from their favorite expression, *Ma petite pa'ole d'honneu', c'est inc'oyable* (Me wohd of honnah, it's incwedible). They were mostly Royalists. The type has been known at different periods in the history of France by various names: *Agréables*, *Gommeux*, *Merveilleux*, *Mirliflores*, *Lions*, *Muscadins*, *Muguets*, *Petit-maîtres*, etc. (See Jeunesse Dorée.) The term "Incroyables" is also applied to the exaggerated style of hats which they wore, which had two points and large brims in the front and back.

IN'CUBA'TOR (Lat. *incubator*, one who lies in a place, from *incubare*, to lie within, to incubate, from *in*, in + *cubare*, to lie). A term applied in poultry raising to devices used for artificial incubation or the hatching of eggs. Artificial incubation was successfully practiced in very ancient times in Egypt and China and probably other countries. The methods and appliances still used in China are quite simple and even crude, but are employed with great skill and success. Réaumur, the eminent French physicist, used successfully a very crude form of incubator, consisting of a barrel heated with fermenting manure; but he encountered much criticism and opposition on the ground that chickens

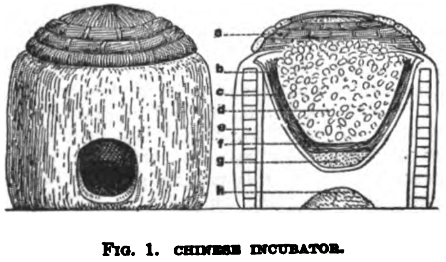


Fig. 1. CHINESE INCUBATOR.

a, cover; *b*, basket; *c*, jar; *d*, eggs; *f*, mat; *g*, ashes; *h*, charcoal.

so hatched "were unfit for human food because they tasted of the heating material, and that such chickens were absolutely sterile, and if the process were persisted in the race of fowls would necessarily die out." Similar prejudice against incubator chicks has persisted until within comparatively recent years; but artificial incubation has become so firmly established, and, the experimental stages having long been passed, the methods and appliances have been made so simple and practical, that it is considered absolutely necessary in the rearing of fowls in large numbers. There were, of course, many failures in the early attempts to devise a practical incubator, although in the first application for a patent on such a device in America, in 1847, some of the principles on which incubators should be constructed were stated with remarkable clearness and accuracy. Practical success with modern incubators may be said to date from the Paris Exposition of 1877, at which Rouillier and Arnoult exhibited their "hydroincubator." "This incubator," says Beale, "has a very large tank, holding about 14 gallons of water, which is divided into three horizontal compartments, each communicating with the others by means of a few small holes. This tank is placed in a wooden case, and surrounded on all sides save the bottom (under which is the egg drawer) by an inch or more of felt, or some other nonconducting material, tightly pressed down. When this tank is filled with hot water, it is found that the water loses only from two to five degrees every 24 hours, according to the temperature of the place where it is kept. If the water in the top compartment only be drawn off, and that in the lower ones be left undisturbed, the former being again filled with boiling water, the heat from this will gradually affect the [temperature of the] lower body and prevent its going down. By repeating this every 12 hours the heat in the egg drawer can be maintained at almost any degree of temperature, with a scarcely perceptible variation." Notwithstanding the simplicity and efficiency of incubators of this type, attempts to devise a practical automatic, self-regulating incubator were persisted in until incubators of this kind have been brought to a high state of perfection and have been generally adopted. Incubators of the automatic type are of two main classes—hot-water and hot-air. The advantages and disadvantages of the better makes of the two classes are very evenly balanced. There are hundreds of different makes of incubators on the market, many of them very efficient when properly handled. An average hatch of over 80 per cent of fertile eggs is secured by experienced poultrymen; but experience, skill, and careful attention to details are essential to such success.

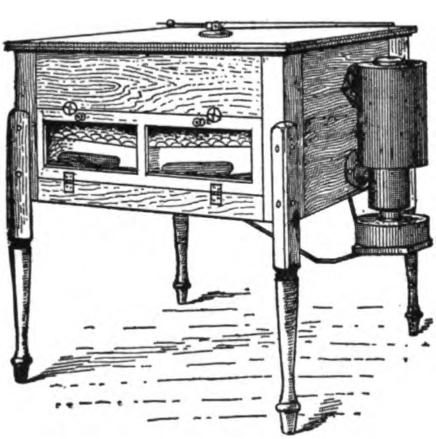


FIG. 2. MODERN INCUBATOR.

The essentials of a good incubator are an egg chamber uniformly heated, preferably from above; a self-regulating source of heat, controlled by a thermoregulator, the actuating arm of which is situated in the egg chamber, and which is sensitive to 1°, or preferably ½°, above or below the desired temperature; and provisions for the ventilation of the egg chamber and for maintaining the proper degree of humidity therein. In addition to these, says Watson, "a convenient appliance for turning the eggs, positive in action, should accompany each incubator. This may be an extra tray that is to be placed bottom side up over the tray of eggs and held firmly in this position while both trays are turned, thus completely transferring the eggs from one tray to another without jar. The different machines have very different appliances for accomplishing this result." The object sought in artificial incubation is to imitate as closely as possible the conditions of heat, air, moisture, etc., which obtain in natural incubation under the hen. The temperature is carefully maintained at about 100° F. or only a few degrees above by placing the incubator in a basement, cellar, or other room where the temperature is stable, and by using a sensitive thermoregulator to control the heat applied; the moisture of the air in the egg chamber is carefully controlled, so that evaporation from the eggs proceeds as under normal conditions; and a sufficient amount of fresh air is supplied to the chamber to carry off the harmful gases which may accumulate and kill the incubating chick. The frequent turning of the eggs during the earlier stages of incubation is believed to have an analogy in the practice of the hen. However, it is not considered advisable to disturb the eggs after the eighteenth day, or to open the incubator thereafter until the hatch is complete and the chicks dry. As the success of incubation depends so largely upon maintaining the proper moisture conditions in the air of the egg chamber, some reliable means of controlling these conditions is essential. It has been proposed to use the normal loss of weight of eggs during incubation under brooding hens as a guide for this purpose. The West Virginia Agricultural Experiment Station found that the eggs which hatched under hens lost on an average 16.5 per cent of their weight in 19 days. The infertile eggs and those which did not hatch lost from 1 to 2 per cent less. The normal loss of weight of 100 eggs under natural incubation was found to be about 10 ounces in 6 days, 20 ounces in 12 days, and 31 ounces in 18 days. By weighing the eggs in the tray at the beginning of incubation, and at intervals during the process, the progress of evaporation (loss of weight) may be determined, and the ventilation and humidity so controlled as to make the loss of weight conform to the normal figures. Except in very dry climates there is said to be more danger of oversaturation than undersaturation of the air. A humidity of 45 per cent saturation is considered safe, as a rule.

If artificial incubation is practiced, some provision must be made for the care of the chicks when they leave the incubator. Variously artificially heated devices known as brooders are used for this purpose. These may be very simple and cheap or elaborate and expensive. Almost all manufacturers of incubators also make brooders, and there is consequently a great variety of forms to choose from. The requisites of a good brooder are that it should be: (1) warm (90°–100° during the first week, with gradually lowering temperature thereafter), and economical of heat, which is preferably applied mainly from the sides or above; (2) clean, dry, and well ventilated; (3) simple in construction and so arranged that the chicks may be seen. The brooder should be so constructed that the chicks may go out for exercise and return at will.

Bibliography. The literature of the subject is voluminous. All up-to-date treatises on poultry raising explain the processes of artificial incubation and describe methods and appliances.

Consult: Cyphers, *Incubation and its Natural Laws* (Boston, 1894); Beale, *Profitable Poultry Keeping* (New York, 1895); Stoddard, *The New Egg Farm* (ib., 1900); Watson, *Farm Poultry* (ib., 1901); Wood, *Incubation and Incubators* (United States Department of Agriculture, Farmers' Bulletin 236, Washington, 1905); G. Bradshaw, *Artificial Incubation* (Sydney, Australia, 1909); G. B. Hawks, *Incubation and Brooding* (Clinton, Wis., 1909); J. W. Hurst, *Successful Incubation and Brooding* (London, 1911); P. Cooke, *Successful Incubation* (Los Angeles, 1911); *Incubators and Chicken Rearers* (New York, 1912); J. H. Robinson, *Principles and Practice of Poultry Culture* (Boston, 1912). See POULTRY.

INCUBATOR. A laboratory device used in the study of bacteria (q.v.) to provide a container in which a constant and definite temperature can be maintained, for the growth and development of bacterial cultures. It consists usually of a metal case having double walls, the space between being filled with water and often, as an additional means of insulation, a layer of felt. The temperature may be maintained at any desired point by a bunsen burner placed beneath, automatically controlled by some thermostatic device, and the condition of the contents may be examined from time to time through a door of heavy plate glass within an outer heavily insulated door. Several designs of incubators are in use in bacteriological laboratories, depending upon the particular line of investigation or the temperature desired. They are also called *brooding ovens* and *thermostats*, though the last term is commonly confined to devices intended to *control* temperature. Consult Abbott, *Principles of Bacteriology* (Philadelphia, 1909). See *Bacteriological Technique* under DISEASE, GERM THEORY OF.

IN'CUBUS (Lat., nightmare). 1. A sprite or demon, thought to be the cause of nightmare. In the Middle Ages it was very commonly believed that the incubus had carnal knowledge of women while asleep, and that from this connection deformed children sprang. The *succuba* was the corresponding female sprite, supposed to consort with sleeping men. Consult Tylor, *Primitive Culture* (London, 1903), and Lehmann, *Aberglaube und Zauberei* (Stuttgart, 1908). 2. Metaphorically, a burden upon mind or spirit. 3. A genus of parasitic hymenopters of the family Braconidæ.

INCUM'BENT. In English law, the holder of a benefice or ecclesiastical living. An incumbency is created by the appointment of a person who has taken holy orders to a particular living which is at the disposal of the person making the appointment. The power of appointing to a living is known as an advowson and is itself a species of real property (classed as an incorporeal hereditament) which may be alienated by the holder or transmitted by descent to his heirs. A living comprehends the parsonage, glebe, and other church lands, and carries with it the right to take tithes from the parish for the maintenance of the church and living and the support of the incumbent. The incumbent is deemed to be seised of the premises comprised within the living as of an estate for life, and may be deprived of it for illiteracy, or sexual or other gross immorality, as well as for heresy or conviction of felony. While not, like other tenants for life, strictly subject to the law of waste, his estate was nevertheless liable for dilapidations occurring during his incumbency. See ADVOWSON; BENEFICE; DILAPIDATION; TITHE; and consult Phillimore, *Ecclesiastical Law* (2d ed.).

INCUM'BRANCE (OF. *encombrance*, from *encombrer*, to incumber, from *en*, in + *combrer*, to cumber, from *combre*, obstruction, from Lat. *cumulus*, heap). A generic term, including every kind of charge or burden upon land; every right to or interest in land, whether claimed as security for a debt or as an independent estate, which may be held by any one other than the real owner. Upon a conveyance of the land so charged, a real or common-law incumbrance runs with it, i.e., remains a burden upon it even in the hands of a purchaser or devisee, while an equitable incumbrance binds the land only in the hands of one who takes it without paying value therefor or a purchaser with notice. In the hands of an innocent purchaser for value the land is discharged from the burden and may thereafter be conveyed free from the incumbrance. The most frequent examples of legal (including statutory) incumbrances are afforded by judgments, leases, mechanics' liens, mortgages, easements, and similar burdens; of equitable incumbrances, trusts, equitable mortgages, and restrictive covenants.

A covenant against incumbrances is one of the usual "covenants for title" contained in a conveyance of land. As usually construed, it amounts to a contract of indemnity, securing the grantee against loss by reason of any incumbrance which may exist upon the land at the time of the conveyance. See COVENANT.

IN'CUNAB'ULA (Lat., cradles). A name applied to printed books published before 1500. Specimens of such works are generally rare, and sought after for their historical bearing on the art of printing and, as in first editions of Greek and Latin classics, for their scientific value. The number of incunabula is variously estimated, but is probably upward of 20,000.

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IND. A poetical form of India.

INDE′CENCY. In law, a general term for conduct of a lewd or obscene character committed in public. The term as commonly employed in statutes comprehends (1) the public exposure of the person, as by bathing without proper covering in a public place; (2) publishing or circulating written or printed matter or pictures of an obscene, lewd, or indecent character; and (3) sending such matter through the mails. The last of these is an indictable offense under the Revised Statutes of the United States cognizable by the Federal courts. The others are statutory offenses, classed as misdemeanors, in the several States. All are punishable by fine or imprisonment. In the absence of statute any indecent exhibition in public is indictable at common law as a public nuisance, if calculated to cause scandal, shock modesty, or corrupt morals. See IMMORALITY; OBSCENE.

INDEM′NITY (from Fr. *indemnité*, from Lat. *indemnitas*, security from loss or damage, from *indemnis*, unhurt, from *in-*, not + *damnum*, loss). An engagement, either express or implied, to make good a loss or expenditure. It is not a guaranty within the fourth section of the Statute of Frauds (q.v.), which requires a special promise to answer for the debt or default of another to be in writing. When the indemnitor performs his engagement, he may in so doing pay the debt of another, but the discharge of such debt is not what he promises to do; it is a mere accident of the situation. At times the engagement takes the form of a bond or other writing, but more frequently it is implied from the acts of the parties. Whenever a person asks another to become surety for him, the law implies the promise by the principal debtor to indemnify the surety for any loss that he may sustain by acceding to the request. So, if one joint debtor pays the whole debt, he can recover from his codebtor the latter's share, as where two or more persons become cosureties, there is an implied engagement on the part of each to indemnify the other to the extent of his share of the common loss. Fire and marine insurance policies are contracts of indemnity, the obligation of the insurer being not to pay the amount of the policy in any event, but only to save the insured harmless from loss in the event insured against. See INSURANCE. Consult the authorities referred to under GUARANTY; SURETYSHIP.

INDENT′ED (from *indent*, OF., Fr. *endenter*, It., ML. *indentare*, to notch, from Lat. *in*, in + *dens*, tooth). In heraldry, one of the partition lines of the shield notched similarly to dancette (q.v.), but with the notches much smaller and not limited in number. See HERALDRY.

INDEN′TURE. In English and American law, a deed executed by two or more parties having diverse interests, as by grantor and grantee of a deed of conveyance, obligor, obligee, and surety to a bond, etc. Most deeds, involving or creating an obligation by only one party or by several persons uniting in an identical obligation, or conveying an estate in which one or more persons have interests—as where husband and wife join in a conveyance of the husband's land—are not indentures but deeds poll. It is only where the other party, the grantee or obligee, assumes an independent obligation that an indenture is required. The name is derived from the fact that such deeds were formerly written in duplicate or as separate obligations on the same sheet of paper or parchment, and then torn or cut apart in a waving or indented line, so that their character as parts or duplicates of the same instrument could afterward be established by fitting them together. The single deed, not an indenture, was known as a deed poll because its edge was polled (shaved) or smoothly cut. Though the forms of the two classes of deeds are now identical, the fundamental distinction between them is still strictly observed. It is still the law that the grantee or obligee of a deed which purports to bind him to some payment or other act is not bound unless the deed is in the technical sense an indenture, i.e., is executed by him as well as by the grantor or obligor. See DEED.

IN′DEPEND′ENCE. A city and the county seat of Buchanan Co., Iowa, on the Wapsipinicon River, 39 miles north of Cedar Rapids, on the Illinois Central and the Rock Island railroads (Map: Iowa, F 2). It is in a farming and dairying region and has manufactures of gas engines and culverts. The city contains the State Insane Hospital for Northeastern Iowa, a fine high-school building, and a public library. The water works and electric-light plant are owned by the city. Pop., 1900, 3656; 1910, 3517.

INDEPENDENCE. A city and the county seat of Montgomery Co., Kans., on the Verdigris River, 165 miles southwest of Kansas City, Mo., on the Atchison, Topeka, and Santa Fe and the Missouri Pacific railroads (Map: Kansas, G 8). It has a public library, two hospitals, Elks Home, a good system of parks, a fine courthouse and county high-school buildings. The city is a distributing point for an agricultural region, is situated in the centre of vast gas and oil fields, and has flour mills, planing mills, cracker factories, cotton mills, paper mills, sugar mills, a window-glass factory, vitrified-brick works, Portland-cement plants, an asphalt plant, a rubber refinery, machine shops, and ironworks. Natural-gas and oil wells are numerous in the vicinity. Independence has adopted the commission form of government and has municipally owned water works. Pop., 1900, 4851; 1910, 10,480; 1914 (U. S. est.), 13,296.

INDEPENDENCE. A city and the county seat of Jackson Co., Mo., 10 miles east of Kansas City, on the Chicago and Alton, the Missouri Pacific, and the Kansas City Southern railroads (Map: Missouri, B 2). It is rapidly developing into a residential suburb of Kansas City. St. Mary's Academy is a private school situated here, and there are a fine Federal building, a sanitarium, and a public library. The industrial establishments include a large flouring mill, a planing mill, a foundry, an oil refinery, scale works, and manufactories of brooms, silos, Portland cement, insect powder, gas engines, drop forges, brick, and overalls. Fruit growing is carried on extensively in the surrounding territory, and there is a canning factory in the city. It is also a stock-breeding centre. Independence was settled and incorporated in 1827 and was organized as a third-class city in 1889, the charter of that year still being in operation and providing for a mayor, elected biennially, and a unicameral council. The electric-light plant is owned by the city. Pop., 1890, 6380; 1900, 6974; 1910, 9859; 1914 (U. S. est.), 11,088. Independence was occupied in 1831–38 by the Mormons, who regard the city as the "Zion" where the chief Mormon temple will be ultimately erected on the famous "Temple lot." About 2000 members of the Reorganized Church of Jesus Christ of Latter-Day Saints, which disclaims belief in polygamy, now live in this vicinity. In 1849–50 Independence was a rendezvous and a starting point for emigrants to California, two of the great trails leading from here westward. In the summer of 1862, during the Civil War, a Federal garrison of 312 under Lieutenant Colonel Buel was captured here by a superior Confederate force under Colonel Hughes, and here, on Oct. 22, 1864, General Pleasanton attacked and defeated the rear of General Price's Confederate army.

INDEPENDENCE. A city in Polk Co., Oreg., on the Willamette River, 12 miles southwest of Salem, on the Southern Pacific and the Independence and Monmouth railroads (Map: Oregon, B 3). It is the hop centre of Oregon and carries on a trade in goats, wheat, barley, and oats. There are saw and flour mills, a creamery, and a foundry and machine shop. Pop., 1910. 1160.

INDEPENDENCE, DECLARATION OF. See DECLARATION OF INDEPENDENCE.

INDEPENDENCE DAY. July Fourth, the United States national holiday.

INDEPENDENCE HALL. An unpretentious brick building in Chestnut Street, Philadelphia, erected in 1729–34 and intimately connected with the birth of the nation. In it the Continental Congress met, Washington was made commander in chief of the American army in 1775, and the Declaration of Independence was adopted on July 4, 1776, and four days later read to the people assembled in the street. It is now a museum of Revolutionary and historical relics. See Plate of PHILADELPHIA.

INDEPENDENCIA, ĕn′dâ-pân-dân′syȧ, or **FRAY BENTOS,** frī bân′tōs. A town of Uruguay, the capital of the Department of Río Negro, situated on the Uruguay River (Map: Argentina, H 4). It was founded in 1859 and is of modern construction, with wide streets. The principal edifices are the hospital, school, and court buildings. It is an important river port, being accessible to large ocean-going steamers. It is surrounded by a region devoted to stock raising and is an important centre of the meat-packing industry. The laboratories and stockyards of the Liebig's Extract of Meat Company, which are equipped with the most scientific and hygienic appliances, are located here. Its exports consist of meat products. Pop., 10,000.

IN′DEPEND′ENT CATHOLIC CHURCH IN THE UNITED STATES, THE (POLISH), known also as OLD CATHOLICS. An independent church organized among Polish immigrants in Chicago, with the hope of staying the progress of agnosticism among citizens of Polish descent who had become disaffected towards the Roman Catholic church. Its founder, the Rev. Anthony Kozlowski, attended one of the Old Catholic conferences in Europe and was there consecrated Bishop. A steady growth is affirmed of the church, both in the consciousness of actual reformatory tendencies and in numbers of adherents and strength of organization. It has established a hospital, a dispensary, an orphanage, and a Home for the Aged in Chicago, and has acquired a considerable property; primary, a grammar, high, and industrial schools have been established. All these schemes are connected and form integral parts of a central philanthropic institution, called St. Anthony's Home. In October, 1902, Bishop Kozlowski addressed a letter to the House of Bishops of the Protestant Episcopal Church in the United States asking for intercommunion. The subject was referred to a committee for consideration, but no definite action was taken. The estimates of members in the church vary. A careful computation gave it, in 1913, 32 ministers, 30 churches, and 16,000 communicants.

INDEPENDENT CHURCHES OF CHRIST IN CHRISTIAN UNION. See CHRISTIAN UNION, INDEPENDENT CHURCHES OF CHRIST IN.

INDEPENDENT METHODIST CHURCH. See METHODISM.

INDEPENDENTS. Such bodies of Christians as claim the right of each individual church to administer its own affairs, free from ecclesiastical or civil authority. In history the name has been usually applied to the Congregationalists of Great Britain, who differ from the Congregationalists of America and other countries in laying less emphasis on the fellowship of the local churches. The first Independent church was organized in London about 1555, and the Brownists (q.v.), or Separatists, as the Independents were first called, steadily increased in numbers in spite of persecutions and emigration. They were prominent in the Westminster Assembly. See CONGREGATIONALISM.

INDEPENDENT TREASURY. The name given to the system of keeping and disbursing the public money without the intermediary action of banks, State or national, adopted by the United States in 1846. The Act of Aug. 6, 1846, provided, in brief, that the public revenues should be held, until actually paid out, in the vaults of the Treasury at Washington or in the several subtreasuries in the larger cities created by the act. Prior to this date the government receipts had been deposited in banks. The first Bank of the United States (see BANK, BANKING) was established in 1791, largely with the view of facilitating the fiscal operations of the government. In it or its branches were deposited the government funds, and from it were obtained temporary loans in anticipation of the revenue. When the bank charter expired, in 1811, the government funds were deposited in the State banks throughout the country. With the subsequent suspension of specie payments, in 1814, the government not only suffered with other creditors, but was seriously embarrassed by the fact that there was no standard national currency. In 1816 the second bank of the United States was chartered for a period of 20 years, and for the greater part of its existence it acted as the fiscal agent of the government. Its effort, beginning in 1829, to obtain a renewal of its charter led to a violent political contest, in which the opponents of the bank, led by President Jackson, won the victory. Though the charter did not expire until 1836, the President in 1833 ordered that no further deposits of government funds be made in the bank, and that the funds of the government be gradually withdrawn. This order for the "removal of the deposits" was made on the alleged ground that the bank was unsound and that the public money was in danger.

Beginning October, 1833, the government funds were deposited in State banks. Contracts were entered into between the Secretary of the Treasury and the several banks fixing the conditions upon which deposits were to be received. The refusal to recharter the Bank of the United States, together with the deposit of government funds in the State banks, led to an ominous expansion of these institutions. A speculative era, marked especially by enormous sales of public lands, and the deposit or distribution of the government surplus with the States (1837), now set in, which culminated in the panic of 1837. The government funds were tied up in the nonspecie-paying banks, and Congress was called together in September, 1837, to devise measures of relief. President Van Buren favored a complete separation of the government from the banks, the establishment of an independent treasury, and a requirement that all debts due the government be paid in specie. It was the latter provision which caused the defeat of the measure, as it appeared to the friends of the banks as a discrimination against the bank note. Towards the close of Van Buren's administration (June 30, 1840) the measure for which the President had fought valiantly was enacted into law, but not without the concession that in the first year of its operation only one-fourth of the government receipts need be in specie, a further fourth being added each year until the whole should be so payable. The victory was dearly bought, for the party went down to defeat at the polls in November. The new administration promptly repealed the law (Aug. 13, 1841), but in the fruitless controversy with President Tyler over the Bank Law failed to provide any substitute for it. Public officials were left to their own devices in the custody of the public funds, and it was not until a new political revolution had occurred that the independent treasury system was finally established by the Act of Aug. 6, 1846.

The spirit of the measure was an absolute divorce of the Treasury from the banks. The government was henceforth to keep its own funds, and to recognize only money issued by Federal authority, specie and Treasury notes, in the government operations. The vaults and safes provided for keeping the money of the government at Washington, and at such other places of deposit as were fixed by the law, were declared to constitute the Treasury of the United States. The Treasurer of the United States and assistant treasurers, and all other officials, were required to keep safely, without lending, using, depositing in banks, or exchanging for other funds, except as allowed by the act, all public money received by them or otherwise in their custody, until the same was ordered by proper authority to be transferred or paid out. In the early experience of the system some embarrassment was created by the failure to provide at once the necessary protection for the money in all the places where it was kept. But in general the system has worked well, and loss by theft or defalcation has been slight compared to the loss suffered through dealings with unsound banks in earlier years.

The isolation of the Treasury contemplated by the act soon proved illusory, and little by little inroads have been made upon the principle. The spectacle of the Treasury coming to the "relief of the money market" has become familiar. The "relief" thus afforded consists of placing in circulation money which the law accumulates in the hands of the government. Operating with a surplus of revenue over expenditure, the government balances may and do grow to such a size as materially to affect the volume of money in circulation. This, then, is a Treasury reserve which may be unloosed when a stringency in the money market occurs, and the fact that the Secretary of the Treasury is called upon for such relief is evidence of the futility of attempting utterly to separate the government's operations from all business affairs. The independent Treasury was not 10 years old before the possible dangers of an accumulation of funds were perceived, and in 1853 large redemptions of bonds were made to avoid them. In the panic of 1857 the government escaped unscathed, and this added to the popularity of the independent treasury system.

But with the fiscal necessities of the Civil War the principle of isolation was broken down. The banks became essential to the support of the government. The Secretary of the Treasury secured their aid in making the first loans of the war. He would not recognize their notes in the government operations, but soon brought forward his plans for transforming the banks into national institutions under Federal control, with power to issue notes of a kind which could be recognized by the government. When the national banking system was organized, in 1863, the banks were allowed to become depositories of the public money, except the receipts from customs, under regulations established by the Treasury Department. Customs receipts, being in specie, were excluded from the funds capable of being deposited, since banks were not then paying specie. These deposits in the banks are secured by United States bonds deposited with the Treasury Department. The extent to which the banks have been used as places of deposit has varied with the state of the Treasury and the nature of its operations. When loans have been made, the money has been paid in through banks and allowed to remain there until expended. In the refunding operations of 1879 the banks sold nearly $400,000,000 worth of bonds and held at one time (May, 1879) as much as $279,544,645. On June 30, 1914, the deposits in national banks amounted to $93,388,666, as compared with $324,852,056 held in subtreasuries.

The idea of the Independent Treasury Law was that the banks should not interfere with the Treasury, while in its practical administration, with the enormous growth of government revenue, the problem has been for the Treasury so to conduct its operations that it shall interfere as little as possible with the banks and the ordinary course of business. In principle the government pays cash, demands cash, and keeps its funds in a strong box—a method of conducting business entirely at variance with the usual practice in mercantile life. The income and outgo of the government have not, moreover, the regularity which frequently characterizes mercantile affairs. Money accumulating in the Treasury in anticipation of future payments is withdrawn from circulation. Such withdrawal may accentuate a stringency, while the subsequent payment may aggravate a plethora. As an offset to these disadvantages of the system, it has been contended that it equalizes conditions by permitting the Secretary of the Treasury to come to the "relief" of the money market. This is a questionable advantage. The relief is contingent upon a plethoric Treasury; it is, moreover, largely in the discretion of one man, the Secretary of the Treasury, whose impulsiveness or conservatism may materially affect the relief afforded. Finally, when determined upon, it is not always as speedy as desired. The requirement that government deposits should be secured by United States bonds worked sometimes serious hardship in time of stringency, since such bonds commanded a high price and were not always immediately attainable. By an order of the Secretary, dated Oct. 4, 1902, banks were permitted, under certain conditions, to substitute specified State and municipal bonds for the national bonds hitherto required. It was hoped that in this way the Treasury would be able to give a larger measure of relief than formerly. In the Banking Act of Dec. 23, 1913, was incorporated a provision by the terms of which the independent Treasury may, in the discretion of the Secretary of the Treasury, be practically abolished. Moneys held in the general fund of the Treasury, with the exception of funds for the redemption of national bank notes and for the redemption of Federal reserve notes, may be deposited in the Federal reserve banks; and these banks may be required to act as fiscal agents of the United States. No deposit of securities with the Treasury against moneys thus deposited with the Federal reserve banks is required by the law. The Secretary of the Treasury may deposit funds in member banks also. Consult: David Kinley, *Independent Treasury System of the United States and its Relations to the Banks of the Country* (Washington, 1910); M. S. Wildman, "Independent Treasury and the Banks," in *American Academy of Political and Social Science, Annals* (Philadelphia, 1910); McLaughlin and Hart (eds.), *Cyclopedia of American Government*, vol. ii (New York, 1914). See FINANCE; BANK, BANKING.

INDERAB. See ANDERAB.

IN'DESTRUCT'IBIL'ITY OF MATTER. See MATTER.

IN'DETER'MINATE COEFFICIENT. See COEFFICIENT.

INDETERMINATE EQUATION. See EQUATION.

INDETERMINATE MULTIPLIERS. The use of indeterminate multipliers is well illustrated by Bézout's method of elimination in solving systems of simultaneous equations. For example, let it be required to solve the system of equations,

$$\begin{aligned}(1)\quad 4x-5y+2z&=0.\\(2)\quad 3x+2y+7z&=28.\\(3)\quad x-\ y+2z&=5.\end{aligned}$$

Multiplying the members of the first equation by λ and those of the second equation by λ' and adding to those of the third equation, we obtain the equivalent system,

$$\begin{aligned}(4)\quad 4x-5y+2z&=0.\\(5)\quad 3x+2y+7z&=28.\end{aligned}$$

$$\begin{aligned}(6)\quad (4\lambda+3\lambda'+1)x-(5\lambda-2\lambda'+1)y&\\+(2\lambda+7\lambda'+2)z&=28\lambda'+5.\end{aligned}$$

Selecting for λ, λ' values such that

$$\begin{aligned}(7)\quad 5\lambda-2\lambda'+1&=0,\\(8)\quad 2\lambda+7\lambda'+2&=0,\end{aligned}$$

we find that $\lambda=-\frac{11}{39}$, $\lambda'=-\frac{8}{39}$, and hence, from equation (6), $x=1$. Choosing next λ, λ' such that

$$\begin{aligned}(9)\quad 4\lambda+3\lambda'+1&=0,\\(10)\quad 2\lambda+7\lambda'+2&=0,\end{aligned}$$

we find that $\lambda=-\frac{1}{22}$, $\lambda'=-\frac{3}{11}$, and hence, from equation (6), $y=2$. It may similarly be found that $z=3$.

INDETERMINATE PROBLEMS. See DIOPHANTINE ANALYSIS.

INDETERMINATE SENTENCE. A sentence of a person convicted of crime to an indefinite period of imprisonment. Up to a very recent date the policy of the criminal law has been to prescribe for each crime committed a definite period of imprisonment or to leave it to the judge under whom the wrongdoer was convicted to fix the period within limits prescribed by statute. Under laws providing for the indeterminate sentence the judge no longer fixes the period of detention, but sentences the prisoners for an indeterminate time between limits prescribed by him within the limits fixed by law, as, e.g., for a term of not less than three nor more than 10 years.

The indeterminate sentence represents a new principle in penology, based on the view that the object of imprisonment is not punishment for the crime committed, but the reformation of the offender and his restoration to society as soon as he has demonstrated his fitness to lead a free and responsible life. This view is based on the principle which is slowly coming to dominate the thought of civilized society, that the sole aim of a rational penal system is the protection of society and not vengeance or retributive punishment. This conception involves the corollaries that no wrongdoer should be imprisoned longer than is necessary for the protection of the community, nor be released until he has by his course of life demonstrated that he can safely be rehabilitated as a free member of the community. In order to make the indeterminate sentence an effective means of attaining these ends it is obviously necessary, first, that prison administration shall be such as to give the convict opportunity to demonstrate his fitness or unfitness for release, and, second, in the case of wrongdoers who have formed criminal habits, that they shall be enabled to work out their salvation under reformative conditions. Unfortunately neither of these conditions is realized in the present prison system, with the consequence that the indeterminate sentence has thus far failed to meet the expectations with which it was introduced. It has not, however, proved a complete failure, even under present conditions, and, having secured a foothold in the penal system, it furnishes a powerful incentive for the reformation of that system. In the meantime, coupled with the principle of conditional release and supervision of the discharged convict under probation, it has proved its value even in the case of inmates of the ordinary prisons, though it has naturally attained its greatest success in the case of young persons committed to institutions of a pronounced reformatory character. The system was first employed in connection with the celebrated Elmira Reformatory of New York in 1876, but it was not till 1889 that it was applied in a cautious, tentative way to commitments to the State prisons. Since that date it has gradually spread to other States and was in 1914 in force in 22 of them. It has not, however, been adopted in European countries. Foreign penologists approve it "in principle," but, except in rare instances, deem it inapplicable in their own countries for the reasons (1) that the prevailing conceptions of guilt and punishment, which are still largely based on the vindictive theory, are incompatible with the principle of the indeterminate sentence; (2) that for its successful working an individualized treatment of the offender is necessary, and that this is in practice, under present conditions, impossible to obtain; and (3) that the difficulties in the way of securing a proper and impartial administration of the function of discharging prisoners are too great to warrant the experiment. It is likely that it will be necessary for America, through the reform of her prison system, to make a more satisfying demonstration of the value of the indeterminate sentence in order to secure its acceptance in foreign countries.

Nowhere, as yet, has the principle of the indeterminate sentence been carried to its logical conclusion—of a sentence unlimited in duration, with no maximum or minimum limits imposed by law or by judicial discretion. This is the goal of the more advanced penologists and prison reformers, and it is evident that that system cannot fully accomplish the purposes which it is designed to effect without such extension; but it is not likely to commend itself to legislatures or to the public except as a part of a sweeping measure of prison reform. See IMPRISONMENT; SENTENCE; PUNISHMENT; PRISONS; PENOLOGY.

INDETERMINISM. See INDIFFERENTISM.

INDEX (Lat., indicator). An alphabetical list of names, topics, words, and the like, treated in a book, with indications of the passages in which they occur. The index usually comes at the end of the book; the analytical table of contents is normally placed at the beginning, except in the case of French, Italian, and Spanish books.

As books began to multiply after the invention of printing, the need of indexes was felt, and their value was recognized. Many books of the sixteenth and seventeenth centuries have well-made indexes of such fullness and value as put to shame the farcical substitutes issued by many modern publishers when they give any at all. Numerous authorities might be cited as to the worth of a good index in enhancing the value and usefulness of a good book. Long and loud have been and are the complaints against the publication of books of knowledge without indexes, emphasizing Carlyle's growl against "books born of Chaos, which want all things, even an index." Lord Campbell of England, and Horace Binney of Philadelphia, each advocated withholding copyright from any author who published a book without an index. "I have come," says the latter, "to regard a good book as curtailed of half its value if it has not a pretty full index. It is almost impossible, without such a guide, to reproduce on demand the most striking thoughts or facts the book may contain, whether for citation or further consideration." The value still put by many scholars on the old Delphin edition of the classics is based solely on its copious indexes. An incalculable amount of time has been lost to students and scholars in fruitless search for much wanted bits of information buried from sight in unindexed pages of books of value and authority. What the seeker demands is a complete index, and it is essential that this should not only refer to the letter, but should also embody the spirit of the work indexed. To this end the indexer must possess intelligence, quickness of perception, the power of analysis and condensation, and the ability to put himself en rapport with the author and his work, of the subject of which he must himself have a very considerable knowledge. Any index is valuable in proportion as it is concise in expression and accurately exhaustive, not only of the broader statements of fact or of opinion, but also of the small points of detail, the incidental and illustrative references contained in the book or volumes to which it aims to be the guide or key.

Minuteness of indexing must vary according to character and uses of books indexed. Before beginning to make entries, an indexer should read the entire book, usually in the "page" proof. He may then indicate by underlining words in the text or writing chosen headings in the margins against the topics to be indexed. Before entering on the actual work of preparing entries he must determine the general character of the index he is to make. For a book may require a general index of quite obvious subjects treated in it, as Bryce's *American Commonwealth;* a name or word index, as for atlases, botanies, genealogies, etc.; an index of ideas more or less difficult to reduce to alphabetic key words, as Emerson's *Essays*, Holmes's *Autocrat*. The indexer cannot be too careful in choosing headings or catchwords, which must not only represent the subject treated, but also be such as would occur to the seeker who has not the text before him. In form these should approach the subject headings in a good library catalogue, and the indexer should in the main be governed by the well-known principles of subject cataloguing. Entries on the same subject should not be scattered among various synonymous headings. Each subject must be indexed every time it occurs, and related matter should be indicated by cross references. If entries under headings are few, it is sometimes advisable to repeat them under each heading needed to make reference easy and complete; if many, a single heading may be chosen for entries and cross references made from other possible headings. Entries should invariably be concise, definite, and specific. Scattered page references should not be massed under a heading without clew to the character of the information given. Where matter relating to a single subject is given consecutively and is brief, a single reference may suffice, but if extended it should be analyzed under headings. In a book on municipal affairs, e.g., the seeker must not be forced to examine several pages on the mayor of New York to ascertain his salary. Specific rather than general headings should be chosen; e.g., entry should be under potatoes, not tubers, sparrows rather than birds, cross reference being made only when necessary. In general, indexing under the main subject of the book should be avoided. This brings too great a mass together and renders the heading practically useless. The excellent index of Fiske's *American Revolution* has but seven entries under "Revolution." A work in several volumes should have a general index to all in the last one. Separate indexes to each volume (except for serials) are seldom afforded.

Each entry should be written on a separate slip, and the slips alphabeted in trays. Library supply houses make slips 5 × 7.5 or 7.5 × 12.5 centimeters, and trays to fit. Careful, final editing of entries is necessary to assure consistency, proper cross reference, clear punctuation, and absolute accuracy. Words alike in spelling but different in meaning should be repeated as headings. Entries like the following are to be avoided:

Lead, copper
    metallurgy
    kindly light
    poisoning

Entries should be arranged in alphabetic order, following the rules for arrangement given in Cutter's *Rules for a Dictionary Catalogue*, or some other standard authority. When verified and edited, slips may be sent to the printer either pasted in order on large sheets, or numbered, punched, and tied together, or the entries may be copied on sheets. Great care is essential in verifying both the original entries and the printer's work, an index error being serious.

Bibliography. A paper on "Indexing," by J. B. Nichols, in *Library Journal* (New York, October, 1892), gives very excellent directions and suggestions for would-be indexers. H. B. Wheatley's *How to Make an Index* (London, 1902) is entertaining reading and valuable in suggestion; it contains the rules of the English Index Society. More recent treatises are: Petherbridge, *Technique of Indexing* (ib., 1904); Clarke, *Manual of Practical Indexing* (ib., 1905); Wheeler, *Indexing: Rules and Examples* (Albany, 1905; rev. ed., 1913); Kaiser, *Systematic Indexing* (New York, 1911).

INDEX, IN MATHEMATICS. See EXPONENT.

INDEX (more fully INDEX LIBRORUM PROHIBITORUM). A catalogue published by papal authority in the Roman Catholic church of books the reading of which is prohibited to members of that church, whether on doctrinal, moral, or religious grounds. A natural consequence of the claim of the church to authority in matters of religion is the right or the duty of watching over the faith of its members, and of guarding it against every danger of corruption from books believed to be injurious to faith or to morality. The earliest recorded exercise of this restrictive authority is the prohibition of the *Thalia* of Arius; and a council of Carthage, in the year 398, issued, even for bishops, a similar prohibition of Gentile books, although it permitted to them the reading of the works of heretics. The earliest example of a prohibitory catalogue is found in the decree of a council held at Rome (494), under Pope Gelasius, which, having enumerated the canonical books of Scripture and other approved works, recites also the apocryphal books, together with a long list of heretical authors, whose writings it prohibits. The mediæval popes and councils pursued the same course as to the heterodox or dangerous writings of their respective periods, and the multiplication of such books after the invention of printing led to a more stringent as well as more systematic procedure. Henry VIII of England published a list of prohibited books in 1526, and a larger one (containing 85 titles) in 1529, in which year Charles V published for the Netherlands his most noteworthy edict against dangerous reading, with a long list, which was included in that issued by the university press of Louvain in 1546 and again in 1550. Similar lists appeared by authority at Venice, Paris, and Cologne, and Paul IV issued in 1557 and 1559 what may be regarded as properly the first *Roman Index*. One of the gravest undertakings of the Council of Trent was a complete and authoritative enumeration of all those books the use of which it was expedient to prohibit to the faithful. A committee was appointed for the purpose and had made great progress in the work; but it was found impossible to bring the examination of the books to an end before the close of the council, and all the papers of the committee were handed over by the council to the Pope. When the work was completed, the result, known as the *Tridentine Index*, was issued with the bull *Dominici Gregis Custodiam*, by Pius IV in 1564. From this time the burning of dangerous books fell into disuse, and the church contented herself with warning her children against their use, under penalty of purely ecclesiastical censure. Further additions and certain modifications of the rules of this *Index* were made by Sixtus V, Clement VIII, Alexander VII, and Benedictine XIV. It was republished in 1595, and, with the addition of such books as from time to time it was deemed expedient to prohibit, in several subsequent editions, the most remarkable of which are those of Brasichelli (Rome, 1607); Quiroga, *Index Librorum Expurgandorum* (Salamanca, 1601); and Sotomayor, *Novissimus Index* (Madrid, 1648). In the intervals between the editions the decrees which make further additions to the *Index* are published at Rome and circulated in the various countries. The latest edition of the *Index* is by Leo XIII (Rome, 1900; reprinted under Pius X in 1904 and in 1907).

The prohibitions of the *Roman Index* are of two classes, either absolute and total or partial and provisional, until the books shall have been corrected. The edition of Quiroga, mentioned above, gives a list of the latter class, known as *Index Expurgatorius*. The ground of the prohibition may be either the authorship of the work or its subject, or both together. Under the first head are prohibited all the writings of *heresiarchs*—i.e., the first founders of heresies—no matter what may be the subject. Under the second head are prohibited all books confessedly immoral, and all books on magic, necromancy, etc. Under the third are prohibited all books of heretical authorship treating on doctrinal subjects; all versions of the Bible by heretical authors; and all books, no matter by whom written, which contain statements, doctrines, or insinuations prejudicial to the Catholic religion. Formerly only books were examined against which complaint had been made, but in 1908 Pius X extended the care of the congregation to all published books that are likely to do harm. The preparation of the *Index*, in the first instance, was committed to the care of the Congregation of the Inquisition in Rome; but a special Congregation of the Index was established by Pius V and more fully organized by Sixtus V. This congregation consists of a prefect (who is always a cardinal), of consulters, and of examiners of books (*qualificatores*). Its proceedings are governed by rules which have been authoritatively laid down by several popes, especially by Benedict XIV, in a constitution issued July 10, 1753, which is the best and most authentic exposition of a subject on which much misconception exists. The edition of the *Index* by Brasichelli was reprinted, with an English preface, by Richard Gibbings (Dublin, 1837). By far the most elaborate study of its contents is by F. H. Reusch, *Der Index der verbotenen Bücher* (2 vols., Bonn, 1883–85). The same author also reprinted all accessible indexes of the sixteenth century in the *Bibliothek des Stuttgarter litterarischen Vereins*, vol. clxxvi (Stuttgart, 1886). Consult Haven, *Censorship of the Church of Rome* (New York, 1907), and Hurley, *Commentary on the Present Index Legislation* (Dublin, 1908).

INDEX, CEPHALIC, CRANIAL, PELVIC, ETC. A term employed by anthropologists to mark the proportions of certain related parts of the human body, or skeleton, in order to distinguish racial varieties in mankind. An important one, and easy to obtain, is the ratio of the width of the head to the length, called cranial index for the skull and cephalic index for the living subject. To avoid the decimal point at the beginning of the index, the smaller measure of any two concerned in an index is multiplied by 100 and divided by the larger one. For the index of the skull or that of the head the formula would be thus: $\frac{\text{Width} \times 100}{\text{Length}} = \text{I}$. The extreme length of the skull is between the glabella (the protruding ridge of the forehead between and just above the orbits) and the extremum occiput (the most prominent portion of the occiput), and the width is the greatest breadth, wherever that may be. All appliances necessary for these measurements, and for all direct ones of the head or skull, are a set of calipers, a sliding scale, and a tape measure. The metric system has been adopted for all anthropological measurements. For the convenience of anthropologists, printed index tables have been compiled, from which indices may be read off without loss of time. The instruments for measuring other parts of the body, or skeleton, are of great variety and constantly undergoing improvements.

Three terms are applied by anthropologists to heads, according to these measures. Those having cephalic indices with a ratio below 77 are called dolichocephalic, those between 77 and 81.9 are mesocephalic, and those above 82 are brachycephalic. For crania, or skulls of the dead, the indices are about two points lower. In the numerous cases where a finer subdivision is necessary a quinary method of nomenclature is followed—the Germans adopting a series called the Frankfort Agreement; the French, the scheme of Broca, modified by Deniker, as follows:

	Cranial index	Cephalic index
Dolichocephals.........	below 75	below 77
Subdolichocephals......	75 – 77.6	77 – 79.6
Mesocephals...........	77.7–79.9	79.7–81.9
Subbrachycephals.......	80 – 83.2	82 – 85.2
Brachycephals..........	83.3–84.9	85.3–86.9
Hyperbrachycephals....	85 and upward	87 upward

Dolichocephalic skulls of exceptional length have reached an index of 58, the lowest limit, while brachycephalic examples have gone as high as 90 or even 100.

Before proceeding to other indices it should be stated that the cranial and cephalic indices just described are far from being a perfect guide to the classification of mankind, for the subdivisions of the human species have no governing rule and are not subspecies, but separate varieties and mixtures, as with domestic animals.

Again, the ratio between the width and the length of the skull does not give complete information as to its shape. The measurements therefore lead to uncertain conclusions, since precisely the same figures would be obtained from crania or heads of widely different cross section, so that one having an almost rectangular shape, an oval with a narrow end far in front, and a long ellipse would lead to the same index. Unless a large number of skulls among the same people are measured and give something like a uniform result, the measurements are an unsafe guide. Very little good arises from adding a small number of indices and dividing by a number of observations. The average result might be a number to which not a single head in the whole series measured would correspond. It is customary therefore to tabulate results by coördinates. Frequently, when such a plan is pursued, there arise several apexes, as in Italy, the higher number representing the brachycephalic northern Italians with Celtic blood in their veins, and the lower number the southern long-headed Mediterranean type.

The cranial and cephalic indices are not precisely coördinated with purely descriptive characteristics of the human body. It cannot be said that any one of the subspecies of man is either dolichocephalic or brachycephalic, but tendencies towards one or the other exist, as the following table of cephalic indices shows:

Caroline Islanders (black)...........................	69.4
Kashmirians (yellow white)........................	72.2
Bakongo (black).......................................	72.5
Hindus (white, mixed)................................	72.8

Karaya Indians, South America (red)	73.0
Australians (straight-haired blacks)	74.2
Norwegians (blonds)	76.0
Corsicans (white)	76.6
Spaniards of Valencia	76.8
British Isles	77–79
Parsis of Bombay (white)	82.0
Koreans (yellow)	82.6
Malays (brown)	82.8
Aissor, Transcaucasian (white yellow)	88.7
Aleuts (red)	87.8
Magyars (mixed)	87.8
Savoyards (white)	86.9
Sudanese (brown)	86.3
Piedmontese (white)	85.9
Burmese (yellow)	85.7
Armenians (white)	85.6
Tahitians (brown)	85.6
Negritos, Philippines (black)	84.7
Samoans (brown mixed)	83.7
Italians (white)	82.7
Arawaks, Guiana (red)	82.6
Saras, Chad basin, Sudan (black)	82.4
Walloons (white)	82.2
Votyaks (yellow)	82.0

Among the European whites the people of the British Isles are mesocephalic; of France the index is 78–88; of Italy, 75–87; of Spain, 77–80; Switzerland, 76–85, with two types, the long and the short head; Austria, 80–84.

Other indices than those expressing the relation of width to length are also employed. The facial index is the ratio of the width (greatest breadth of the malar bones) to the height, from the glabella or the nasion to the alveolar border of the upper jaw (prosthion) or to the chin point (gnathion), and separates skulls into brachyfacial and dolichofacial, or, according to the German classification, into chamæ-, meso-, and leptoprosops. The ratio of width to length in the orbital orifice separates crania into megasemes (90 and upward), mesosemes (80 to 84), and microsemes (below 84). While the French use the dacryon or lacrimale as medial measure point of the orbital width, the German school prefers the lacrimale or, of late, the maxillo-frontale, i.e., the point where the inner margin of the orbit is met by the sutura frontomaxillaris. The classification then is thus: chamæconch, X to 75.9; mesoconch, 76 to 84.9; hypsiconch, 85 to X. The nasal index is the ratio between the width of the nose (greatest breadth of the nasal wings in the living or of the nasal aperture of the skull) and its height, giving rise to leptorrhine, or narrow-nosed, platyrrhine, or flat-nosed (wide aperture in the skull), with the intermediate term, mesorrhine.

The dental index is based upon the importance which naturalists place on dentition in the classification of mammals. Upon the ratio of the size of the teeth to related parts, Flower divides men into megadont, mesodont, and microdont; and this series bears a surprising relation to the three anthropometric types of man—Negroid, Mongoloid, Caucasoid.

SCHEME OF PRINCIPAL CLASSIFICATIONS ACCORDING TO INDICES

Skull	Dolichocephalic, long skulls. Mesocephalic, medium skulls. Brachycephalic, broad skulls.
Nose	Leptorrhine, narrow noses. Mesorrhine, medium noses. Platyrrhine, flat or broad noses.
Eyes	Megaseme (hypsiconch), round eyes. Mesoseme (mesoconch), medium eyes. Microseme (chamæconch), narrow eyes.
Teeth	Megadont, large teeth. Mesodont, medium teeth. Microdont, small teeth.
Jaws	Orthognathic, straight or vertical jaws. Mesognathic, medium jaws. Prognathic, projecting jaws.
Face	Chamæprosopic, low or broad face. Mesoprosopic, medium face. Leptoprosopic, narrow or high face.
Pelvis	Platypellic, broad pelvis. Mesopellic, medium pelvis. Leptopellic, narrow pelvis.

It may be stated that the methods of anthropological investigation are different with the different schools, but hardly to such an extent as to render results unfit for consideration in comparative work.

Bibliography. Broca, *Instructions craniologiques et craniométriques* (Paris, 1875); Roberts, *Manual of Anthropometry* (London, 1878); Broca, *Instructions générales pour les recherches anthropologiques* (Paris, 1879); "Frankfurter Verständigung über ein gemeinsames craniometrisches Verfahren," in *Archiv für Anthropologie* (Brunswick, 1884); Topinard, *Eléments d'anthropologie générale* (Paris, 1885; Eng. trans., London, 1894); Schmidt, *Anthropologische Methoden* (Leipzig, 1888); Török, *Grundzüge einer systematischen Kraniometrie* (Stuttgart, 1890); Deniker, *Races of Man* (London, 1900); Livi, *Antropometria* (Milan, 1900); Martin, "Ueber einige neue Instrumente und Hilfsmittel für den anthropologischen Unterricht," in *Korrespondenzblatt der deutschen anthropologischen Gesellschaft* (Brunswick, 1903); Bertillon and Chervin, *Anthropologie métrique* (Paris, 1909); Klaatsch, "Kraniomorphologie und Kraniotrigonometrie," in *Archiv für Anthropologie* (Brunswick, 1909); Ranke, *Der Mensch* (Leipzig, 1911); Martin, *Lehrbuch der Anthropologie* (Jena, 1914).

The standard periodicals of anthropology in different parts of the world contain also numerous articles on special methods of research work in physical anthropology. Great interest is shown in a new field of research, that of Palæoanthropology, due to recent finds of the remains of early man (Schwalbe, Klaatsch, Schoetensack (Homo heidelbergensis), Boule, Woodward, and others). See MAN, SCIENCE OF.

INDEX EX'PURGATO'RIUS. See INDEX.

INDEX KEWENSIS, kū-ĕn'sĭs. A reference book of the names of flowering plants. It was conceived by Darwin, who, having experienced difficulty in definitely identifying many of the plant species with which he worked, provided the money for its completion. It was compiled by Benjamin Daydon Jackson (q.v.), under the direction of Sir Joseph D. Hooker, director of the Royal Gardens at Kew. The aim was to record every genus and species of phanerogamous plants published up to 1885; to follow Bentham and Hooker's *Genera Plantarum* as authority for the limitation of genera; to add to each name, whether retained or synonymic, a full reference to its place of publication, retained names being the earliest under which they were published in the recognized genus and not necessarily the earliest specific name; and, finally, to indicate the geographical distribution of each species. Three parts of the supplement which brings the work down to 1895 have appeared, a second supplement covering the period 1896–1900 was completed in 1905, and a third supplement covering the years 1901–05 was published in 1913.

INDEX LAWS. See EXPONENT AND EXPONENTIAL.

INDEX NOTATION. See NOTATION.

INDEX NUMBERS. An index number is a method adopted by statistical and economic writers to exhibit the course of prices of a group of commodities or of commodities generally.

A crude method of attaining this result is to add the prices of the various commodities together. The defects of such a procedure are apparent from the following simple illustration:

	1st date	2d date
Cotton, per lb.	$0.08	$0.07
Flour, per bbl.	3.50	3.25
Pig iron, per ton (2000 lbs.)	18.00	18.50
Total	$21.58	$21.82

If the sum be a criterion, it appears that there has been on the whole an advance in price of the group despite the fall in cotton and flour. A little reflection will show that had pig iron been quoted by the pound instead of by the ton the result would have been different, as follows:

	1st date	2d date
Cotton, per lb.	$0.08	$0.07
Flour, per bbl.	3.50	3.25
Pig iron, per lb.	0.009	0.00925
Total	$3.589	$3.32925

But even here there are still great differences in the initial prices, and the variations are measured on very different scales.

The index number avoids this difficulty by reducing the initial prices to common terms. It establishes the variation of each price from its own starting point and then determines the average variation. The assumed figures above given will serve the purpose of demonstration, and the following statement of relative prices is true for either of the series:

	Price at 1st date	Price at 2d date in terms of price at 1st date
Cotton	$100	$87.5
Flour	100	92.9
Pig iron	100	102.8
Total	$300	$283.2
Average	100	94.4

In this comparison, where each article has an equal weight in determining the result, there appears to have been a fall in price of 5.6 per cent; while in the first statement, where pig iron predominated, a rise in price of 1.2 per cent appeared, and in the second statement, where flour predominated, the fall in price appeared to be 7.2 per cent. It is obvious that the third statement or simple index number is a far better indication of the course of prices of these articles than the other two, where one article or the other dominates the result simply by reason of the fortuitous circumstance that its unit of measurement is relatively large.

The third statement is not, however, an absolutely exact measure of the total price change, since it is not of equal significance that flour falls and that pig iron rises. To the individual consumer no doubt a slight fall in flour is more important than an equal rise in pig iron. It may readily be assumed that he buys for his daily needs 10 times as many things affected by the price of cotton as are affected by that of pig iron, and perhaps four times as many affected by the price of flour as are affected by that of cotton. His relative consumption might be: pig iron, 1; cotton, 10; flour, 40. Hence the price changes noted affect him in varying measure, and this must be accounted for in estimating the significance of the total change. The calculations are as follows:

	Price	Units of importance	Product
Cotton	$87.5	10	875.0
Flour	92.9	40	3716.0
Pig iron	102.8	1	102.8
Total	$283.2	51	4693.8
Average	94.4	..	92.0

On the other hand, in the aggregate consumption of the nation the proportions of the different articles might be quite different, and hence also the significance of these combined changes in the wholesale market. Let us assume them to be: pig iron 1, cotton 2, and flour 4. We then have the following calculation:

	Price	Units of importance	Product
Cotton	$87.5	2	175.0
Flour	92.9	4	371.6
Pig iron	102.8	1	102.8
Total	$283.2	7	649.4
Average	94.4	..	92.8

We have now determined by these slightly different methods the price of the group to have been at the second date, compared with the first, as 94.4, 92.0, and 92.8 respectively are to $100, and we have in these results from assumed figures a fair illustration of the methods of index-number calculations, and the problems to which they give rise.

The problems of a general index number are not dissimilar. The first is the choice of articles whose prices are to be included. No definite statement of what articles should or should not be comprised in the index can be made except that they should be staple articles of general use. It would defeat the object of an investigation aiming to determine the course of general prices, to include specialties, or rarities, or objects of such restricted use as not to be subject to the ordinary influences affecting prices.

The character of the component price series being thus stated, how shall the number be fixed? It must evidently be large enough to include all the more important lines of staple commodities. No precise limit can be fixed. While it would seem obvious that in any effort to determine general prices the greater the number of commodities embraced in the comparison the more accurate the result, such is not the case, since, as the number multiplies, the proportion of articles of limited demand which are more or less removed from the primary influences affecting prices generally increases.

The base line with which prices are compared is usually the average of a series of years, the purpose of taking such an average being to overcome any eccentricities of prices which might characterize a briefer period of time. This practice is not universal, and some well-known calculations have been based upon the prices of a single year. This method is justified on the ground that the prices so chosen were those of normal conditions.

In the combination of the price series into a general index of prices, the simple mean is the most frequent method employed, as illustrated in our first index calculation. This has been the subject of much criticism on the ground of the unequal importance of the objects concerned. To overcome this difficulty two sets of weighted averages have been proposed. The first was one which measured all articles by their importance in the national consumption as illustrated in the third calculation; the second measures articles by their importance in individual consumption as revealed by family budgets and typified in our second calculation. In applying national consumption as a test, we find that calculations of such consumption are very precarious and extend to comparatively few articles. In family consumption we can ascertain for certain groups of persons the proportions of expenditure which cover a much wider range of commodities. But the commodities covered by the family budgets are not the same as those covered by price statistics, since the former represent the retail, and the latter the wholesale markets. In the food products this makes little difference, but in textiles, metals, lumber, and the like there is no little adjustment needed to bring the prices and the relative expenditures into relation.

Those who have done the most to establish more rational and at the same time more complicated calculations have been the first to point out that the ultimate results differ but slightly from those obtained by the somewhat rough calculation of a simple average.

The index number of the London *Economist* is based upon the wholesale prices of 47 commodities which by combination are reduced to 22. The quarterly prices for 1845 to 1850 were arranged as a basis for calculation and the relative prices for subsequent years upon the January prices. The total price index for 1845 to 1850 was 2200, and for later years the price indices are also expressed as an aggregate, without reduction to 100. As in a few cases the full number of articles was not given, this was somewhat misleading. In the table opposite we give the results of this calculation as published by the *Economist*, together with a reduction to the scale of 100.

The general tendencies of price movements, the rising tendency till 1873, and the subsequent downward trend as shown in these figures are amply confirmed by other investigations. The enormous rise in the period of 1861 to 1865 was due not only to the extravagant prices for cotton paid in this period, but also to the fact that in the 22 series represented in the total as many as three were for cotton. This fact, and the prominence given to indigo, and the absence of so important a staple as coal, led to numerous efforts to improve the calculation. Mr. R. H. Inglis Palgrave sought to remedy the defects by a system of weighing each article by its importance in the national consumption—a method already indicated.

Mr. Augustus Sauerbeck published in 1886 in the *Journal of the Royal Statistical Society* an index number which has been brought down to date in subsequent issues of that periodical, and which is in many respects an improvement upon the older calculation. His annual prices are based upon averages of the monthly, and in some important commodities weekly prices, and these are compared with the average prices of 1867 to 1877. The tables embrace 45 series of quotations; and while some commodities are repeated (in different grades), they have been chosen in such a manner that the total number of quotations for a group of commodities such as meats, textiles, iron, and steel represents approximately in its proportion to the whole number of quotations—45—the importance of this group in the commerce of the United Kingdom. The superiority of this calculation rests therefore on the more trustworthy character of its material and the breadth of choice.

In France similar calculations have been based upon the import prices of commodities, and in Germany (Soetbeer's) upon the import prices of goods at Hamburg. The latter are more comprehensive, since Hamburg was so long a free city that practically its entire trade was in commodities imported by sea and land. The calculations of Dr. Soetbeer for Hamburg, based on the average prices of 1847 to 1850, embraced 100 articles, to which were added 14 articles from the British trade returns. Neither the more limited French calculations nor those of Dr. Soetbeer developed any mode of combination other than the simple average.

"ECONOMIST" INDEX NUMBER

YEAR	Total as published	Reduced to scale of 100	YEAR	Total as published	Reduced to scale of 100
1845–50	2,200	100	1885	2,098	95
1851	2,293	104	1886	2,023	92
....	.....	...	1887	2,059	94
1858	2,612	119	1888	2,230	101
....	.....	...	1889	2,187	99
1861	2,727	124	1890	2,236	102
1862	2,878	131	1891	2,240	102
1863	3,492	159	1892	2,133	97
1864	3,787	172	1893	2,120	96
1865	3,575	163	1894	2,082	95
1866	3,564	162	1895	1,923	87
1867	3,024	137	1896	1,999	91
1868	2,682	122	1897	1,946	88
1869	2,666	121	1898	1,891	86
1870	2,689	122	1899	1,918	87
1871	2,590	118	1900	2,125	97
1872 *	2,835	129	1901	1,948	88
1873	2,947	134	1902	2,003	91
1874 *	2,891	131	1903	2,197	99
1875	2,778	126	1904	2,136	97
1876	2,711	123	1905	2,342	107
1877	2,715	123	1906	2,499	114
1878	2,529	115	1907	2,310	105
1879	2,225	101	1908	2,197	100
1880	2,538	115	1909	2,390	109
1881	2,376	108	1910	2,503	114
1882	2,435	111	1911	2,586	118
1883	2,342	106	1912	2,747	125
1884	2,221	101	1913	2,623	119

* Twenty-one articles only.

In the United States comprehensive statistics of prices for the period of 1840 to 1891 were published in the Senate report on wholesale prices, wages, and transportation. The report based its calculations upon the prices of 1860 and furnished an index number comprising 223 different series of prices. These were combined by the method of simple average, and also by estimating the importance of the price series as measured by family consumption. As in previous instances when different methods of combination had been tested upon the same figures, the results of the two methods differed but little. This price index closed with 1891, but the United States Department of Labor in its *Bulletin* has furnished the material for carrying the study of price movements down to the present day.

It should perhaps be mentioned that this report applied the index-number principle to its statement of wage statistics—a procedure which had been previously suggested, but was carried here to execution for the first time. It is also applied effectively to the study of transportation rates. The methods of the report, especially as applied to wages, have been made the subject of searching criticism by the English statistician A. L. Bowley, who has effectively used the index principle in his investigations of the course of wages in England.

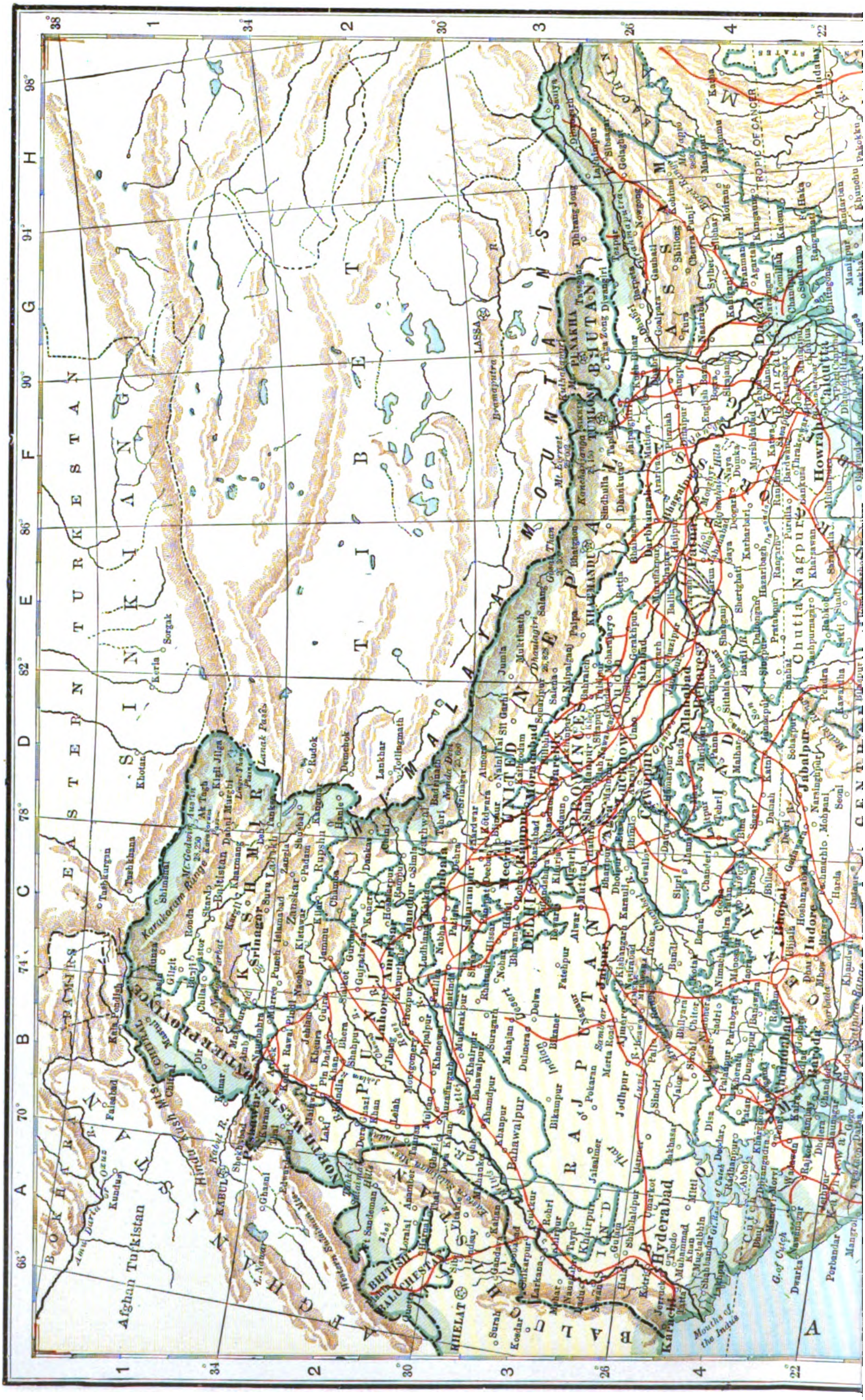
Bibliography. *Senate Report 1394* (Fifty-second Congress, second session, Washington, 1893); Mayo-Smith, *Statistics and Economics* (New York, 1899); Falkner, *Wage Statistics in Theory and Practice* (Boston, 1899); Bowley, *Wages in the United Kingdom* (Cambridge, 1900); id., *Elements of Statistics* (London, 1901); M. G. Mulhall, *Dictionary of Statistics* (4th ed., New York, 1903); W. C. Mitchell, *Methods of Presenting Statistics of Wages* (Boston, 1905); Howard, Bartels and Company, *Statistical Information Relating to Stocks, Cotton, Grain* (Chicago, annually); *Bulletin of Bureau of Labor, No. 59* (Washington, 1905); W. T. Layton, *Introduction to the Study of Prices* (London, 1912).

INDEX OF REFRACTION. See LIGHT.

IN'DIA. A region comprising the middle member of the three great southern peninsulas of Asia and a territory of nearly equal extent to the north, together with Burma, extending eastward as far as the Malay Peninsula. India in this sense constitutes the Empire of India—one of the members, and by far the most populous, of the British Empire. India proper, however, does not extend farther east than the head of the Bay of Bengal, nor does it include some of the northern or westernmost districts of the Empire. The name Hindustan was formerly frequently used instead of India, but it belongs more properly to the north-central portion of India, the land of the Hindus. The name India has been used in a very broad sense, but improperly, so as to embrace the great southeastern peninsula of Asia, which is still sometimes spoken of as Farther India. This article will treat of the Empire of India. Since British influence became predominant there, no other country of the mainland of Asia has been so diligently explored or is now so well known as India. In the form of a great triangle, the Indian Peninsula extends southward between the Bay of Bengal, on the east, and the Arabian Sea, on the west, through 15° of latitude to Cape Comorin (lat. 8° 5′ N.). On the north the peninsula unites with the continental mass in the lowlands of the Ganges basin and the great plains east of the Indus, which connect it with the mighty highlands of the Himalayas. India, within the official boundaries of the British possession (including the native states), stretches north and south through about 29° of latitude. Its east and west extension is across nearly 40° of longitude. The Empire has an area of 1,093,297 square miles of British territory, and together with the native states, which are more or less under the control of the Indian government, has a grand total of 1,802,657 square miles. These figures include Burma as a part of the British territory, while the area of the native states referred to is 709,583 square miles and includes about 700 small divisions governed by native princes, ministers, or councils under political supervision of a Resident, or agent, of the British government, and range in size from Hyderabad, with 82,000 square miles, downward to those consisting of a few small villages. Geographically Burma is not a part of the peninsula of India, but has been attached for purposes of government and is therefore included in this discussion of the Empire of India. (See INDIA, NATIVE STATES OF.) India is thus about half as large as the United States (inclusive of Alaska). It is a world in itself, for the great barrier of the Himalayas, the Hindu Kush, and the Suleiman Mountains shuts it off from land communications with the rest of Asia, except through very difficult mountain passes; the sea is the only means of easy approach. Thus guarded, though by no means completely, by mountain bulwarks and wide seas against intrusion, India was able to develop a civilization and social system peculiar to itself.

Topography. The coasts of India are comparatively little indented except at the mouths of the large rivers and along the northwest shores; and though there are many roadsteads and harbors for small vessels, there are only a few good harbors for large vessels, and they are in the deltas of the rivers or, as at Bombay, under the shelter of islands. The railroad system was therefore planned so as to connect all the leading trade centres of the interior with the largest seaports.

Three distinctly defined physical regions are recognized—the mountain districts of the Himalayas, the low plains of the three great rivers of north India, and the high plateau of the Deccan, extending from the plain of the Ganges to the south end of the peninsula. The colossal ranges of the Himalayas, 1500 miles in length, extend along the north part of the country in several parallel chains separated by deep valleys and table-lands. The most northerly of these ranges is the loftiest, and Mount Everest, the highest mountain in the world, rises to a height of 29,000 feet. In the west the Himalayan ranges are continued by the Hindu Kush, from which the Suleiman and Hala chains stretch to the south, along the western borders of India. The barrier presented by the Himalayas is far more formidable than those of the other ranges and can be crossed only by passes of 17,000 to 19,000 feet in height, above which tower many snow-capped summits. It was through the less difficult but still formidable passes on the northwest border that India was long subjected to invasion; and Burma was the victim of similar attacks through the passes on its north frontier. The mountain rampart has the greatest influence on climate and fertility, for it wards off the freezing winter blasts from the north and condenses the immense volume of water vapor


EASTERN TURKESTAN
SINKIANG
TIBET
HIMALAYA MOUNTAINS
Karakoram Range
PAMIRS
BOKHARA
Afghan Turkistan
AFGHANISTAN
KABUL
BALUCHISTAN
BRITISH BALUCHISTAN
KHELAT
NORTH WEST FRONTIER PROVINCE
KASHMIR
Srinagar
PUNJAB
Lahore
DELHI
RAJPUTANA
SIND
Hyderabad
Karachi
Mouths of the Indus
UNITED PROVINCES
Lucknow
Cawnpore
Allahabad
NEPAL
KHATMANDU
Mt. Everest
BHUTAN
LASSA
Brahmaputra
ASSAM
Chutia Nagpur
Calcutta
Howrah
CENTRAL INDIA
Indore
Bhopal
Jubbulpur
TROPIC OF CANCER
G. of Cutch
66°
70°
74°
78°
82°
86°
90°
94°
98°
38°
34°
30°
26°
22°
A
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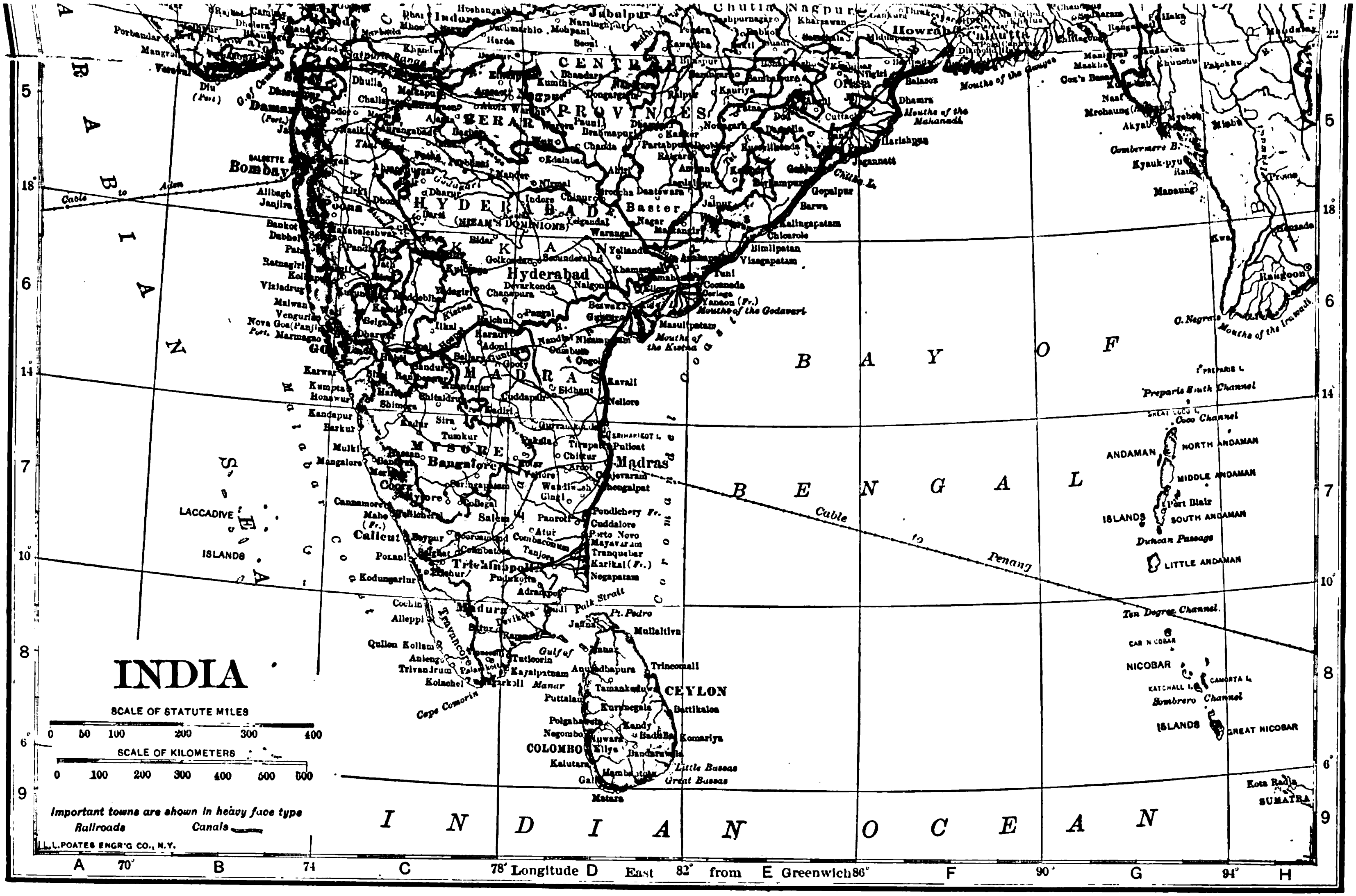

INDIA
SCALE OF STATUTE MILES
0 50 100 200 300 400
SCALE OF KILOMETERS
0 100 200 300 400 500 600
Important towns are shown in heavy face type
Railroads
Canals
L. L. POATES ENGR'G CO., N.Y.
78° Longitude East 82° from Greenwich 86°
70° 74 90° 94°
A B C D E F G H
5 6 7 8 9
18° 14° 10° 6°
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN
CENTRAL PROVINCES
BERAR
HYDERABAD
(NIZAM'S DOMINIONS)
DEKKAN
MADRAS
MYSORE
COORG
Travancore
CEYLON
Chutia Nagpur
Bombay
Madras
Hyderabad
Bangalore
Calicut
Colombo
Howrah
Calcutta
Nagpur
Jubbulpur
Indore
Poona
Goa
Rangoon
Mouths of the Ganges
Mouths of the Mahanadi
Mouths of the Godavari
Mouths of the Kistna
Mouths of the Irawadi
Palk Strait
Gulf of Manar
Cape Comorin
Chilka L.
Cable to Aden
Cable to Penang
LACCADIVE ISLANDS
ANDAMAN ISLANDS
NORTH ANDAMAN
MIDDLE ANDAMAN
SOUTH ANDAMAN
LITTLE ANDAMAN
Port Blair
Duncan Passage
Preparis South Channel
Coco Channel
Ten Degree Channel
NICOBAR ISLANDS
CAR NICOBAR
GREAT NICOBAR
Sombrero Channel
Little Basses
Great Basses
Kota Radja
SUMATRA
Diu (Port)
Daman (Port)
Nova Goa (Panjim) Port.
Marmagao
Mahe (Fr.)
Pondichery Fr.
Karikal (Fr.)
Yanaon (Fr.)
Trincomali
Jaffna
Kandy
Galle
Matara
Negapatam
Tanjore
Trichinopoli
Madura
Salem
Cuddalore
Nellore
Masulipatam
Coconada
Vizagapatam
Bimlipatam
Gopalpur
Cuttack
Orissa
Balasor
Akyab
Kyauk-pyu
Sandoway
C. Negrais

brought by the summer monsoon to vivify the plain below. The barren mountain slopes fall to the south in successive terraces down to the fertile plain teeming with animal and vegetable life. But while the higher slopes of the mountains are devoid of vegetation, some of the wide, high mountain valleys are exceedingly beautiful, most notably that of Kashmir, unexcelled for healthful climate and fertile soil.

The great river plains cross India in a wide belt from east to west, south of the mountains; and at their ends the plains are projected southward, where the Indus and the Ganges-Brahmaputra have advanced their deltas far seaward. On the alluvial lands are the densest population and the richest cultivation of the Empire; for density of population is determined in India, not by the temperature, but by the supply of water available for the farms. But there are waste and almost unpeopled districts also among these lowlands; and the rainless Desert of Thar or Indian Desert, to the east of the Indus delta, extends northeastward almost to the base of the Himalayas.

The third topographic division of the country is the peninsula, the great triangular plateau of the Deccan, from 1600 to 3000 feet above sea level. The north boundary of the plateau is the Vindhya Mountains, which join the plateau to the low plain. The Deccan triangle is further defined by the Western Ghats rising above the fertile and accessible Malabar coast, and in the east by the Eastern Ghats overlooking the Coromandel coast with a narrow coastal plain, difficult of access, for the harbors are few and very poor. No other part of the world testifies more eloquently than the Deccan tableland to the prodigious energy formerly displayed by plutonic forces. The greater part of this immense plateau was built up by outpourings of lava and basalt (trap), which in places are 6000 feet thick.

The coast line of Burma is not deeply indented except where the projecting delta of the Irrawaddy forms the Gulf of Martaban. The low coast and the flooded valleys make Burma the greatest producer of export rice in the world. Farther inland, to the east of the Irrawaddy and on both sides of the river in its upper course, the country is hilly and heavily forested. See BURMA.

Hydrography. The four great rivers of India are the Indus, the Ganges, the Brahmaputra, and the Irrawaddy, the last named in Burma. The heaviest rainfall is not on the plains or on the southern plateau, but on the slopes of the mountains, which pour their torrents into the great rivers below, with the result that the Ganges and the Brahmaputra carry to the sea a volume of water that is entirely out of proportion to their length or the area of their drainage basins. The Indus contributes to the basin of the Arabian Sea the waters derived from the Punjab (land of five streams) and from the plateau of Afghanistan. It is navigable for over 900 miles, but its value as a water highway is small on account of the impetuosity of its current. It is least important among the great rivers. The majestic and smoothly flowing Ganges is far more valuable for navigation than any other river of India. Both the Ganges and the Brahmaputra, which joins it near its mouth, are turbid with fertilizing silt from the mountains, which has formed the great Bengal delta. The Irrawaddy of Burma is navigable by steamers to Mandalay. The rivers of the peninsular part of India, though some of them are of considerable length, are not important for navigation. Among them may be mentioned the Nerbudda (Narbad) and Tapti, both flowing into the Arabian Sea, and the Mahanuddy (Mahanadi), Godavery (Godavari), Kistna (Krishna), and Kavery, which pour their waters into the Bay of Bengal.

Climate. On account of the great extent of India and its differing altitudes, the country has many differences of climate. The whole land may be described as more or less tropical except in the higher altitudes. Slopes of the Himalayas, as high as they are habitable, enjoy a temperate climate; neither is there for the natives an oppressive degree of heat on the high plateau of the Deccan. Among the Himalayas and the Nilgiris Europeans have established sanatoriums amid the most agreeable climatic conditions, where many of them take refuge from the prostrating heat of the hot months. The climate of India, except in the districts of jungle and marsh lands, is not, on the whole, unhealthful for the white race if the ordinary precautions required in all hot countries are observed. The most heated area is that of the northwest, in or about the region of the Indian Desert, where the mean July temperature exceeds 95° F.

By far the most important climatic element is the rainfall, upon which depends the very existence of the people. Throughout the country in general there are only two seasons, the dry and the rainy, also known as the season of the northeast monsoon and the season of the southwest monsoon. These names are derived from the direction of the winds prevailing in the Arabian Sea and Bay of Bengal during the two periods. They are really inapplicable, however, over a great part of India, where the winds are from directions nearly opposite to those indicated by the names of the seasons and are chiefly determined by the axial directions of the local river valleys. Thus, the winds in south Bengal are from the southeast, and in Behar from the east, during the southwest monsoon, and are from the opposite directions in the northeast monsoon. The two seasons in India might therefore more appropriately be called the dry monsoon and the wet monsoon, from their most characteristic features.

The dry monsoon, or season, usually begins in November or December and continues until May. Winds of land origin prevail more or less steadily in the interior, and hence the period is usually marked by great dryness of the air and little or no rain. The first three months of this period (December to February), characterized by a comparatively low temperature, are known as the cold-weather season; and the second three months (March to May), when the temperature increases rapidly and culminates in a period of excessive heat in May, as the hot-weather season. During the cold-weather season storms of large extent, the majority of which form in Persia, enter India from Beluchistan and traverse north India from west to east, distributing light rains in the Indo-Gangetic plains and heavy snow over the western Himalayas. The severity of the hot-weather season is occasionally relieved by the occurrence of thunderstorms and dust storms, which cool the air for brief periods. The characteristic features of the dry season are persist-est dry weather, with clear skies, and large diurnal range of temperature.

The rains of the wet season, or the southwest monsoon, set in suddenly on the west coast of India in the first week of June, and a little later (in the second or third week of June) on the Bengal coast, and extend more or less rapidly into the interior. The prevailing winds of this period are of oceanic origin and are, in fact, the northward extension of the winds of the southeast trades. The extension of these winds northward across the equator and into the Indian seas usually begins in the third week of May and gives a complete and permanent change of weather (lasting for five or six months), more especially over the land area of India. The winds due to the extension of these massive humid air currents usually begin to give daily rain to the Malabar coast in the last week of May and to the Bombay coast on June 4 or 5. The humid currents advance more slowly into the interior, but are usually established before the end of the month over the whole of India. Cloudy, showery, or rainy weather, with a moderately high temperature and small diurnal range of temperature, prevails during the next three months, which are in striking contrast with the excessively hot and dry weather that has prevailed during the previous two or three months. Over the mountain tracts of Assam and over the plains of Lower Burma the yearly rainfall exceeds 500–600 inches, and in one particular year the record of 805 inches was established.

Sometimes the wet monsoon is greatly delayed or has little strength, and this failure of an adequate supply of rain involves the direst tragedy. (See section on *Famines.*) India and the adjacent seas are often visited by the destructive hurricanes called typhoons, whose tracks are frequently traced by ruined towns and crops.

The soil, except on the steep mountain slopes, is of great fertility, being largely composed of alluvium throughout the plains and in the mountain valleys, and of disintegrated volcanic rocks, from which many rich soils are derived, on the southern plateau. The food demands of the enormous population make it necessary to maintain a high degree of fertility.

Flora. The very unequally distributed rainfall causes great differences in vegetation. The almost rainless region just east of the Indus has desert conditions of plant life, while the low-lying coast lands along the Gulf of Bengal have large areas of dense, wet jungle. The plains of the Deccan east of the Western Ghats have little rain, for it falls on these mountains instead of on the plains. Vegetation is therefore sparse where irrigation is not applied; while the lower slopes of the northern mountains, drenched with rain, are densely wooded; and far above the forests there is an arctic flora close to the glaciers and snow fields. The greatest possible area of plowed fields is needed for food production, and so a large amount of forest area has been cleared for cultivation. Timber supplies are chiefly derived from the mountain slopes, from the hilly lands of parts of the Deccan, and from Burma. Teak, the most valuable wood, is cut on the slopes of the Western and Eastern Ghats, in Lower Burma, and to some extent among the western hills of the Deccan. Sandalwood and blackwood are found in the teak-growing regions; sal, another hard wood, and cedars, on the slopes of the Himalayas; and the common woods are scattered, not profusely, over various parts of the country. The larger part of the plain has no forests, and in the irrigated districts there are few trees except in the watered gardens. The government has all the best timber areas under protection and applies forestry methods to their management. The bamboo, the mango, and the coconut, useless as timber but of incalculable popular utility, are widely distributed. One of the most distinctive of the Indian trees is the banyan. The forests of Assam, Malabar, and the lower slopes of portions of the Himalayas are luxuriant in the extreme and present a wealth and variety of vegetable forms which are equaled or surpassed only by the forests of tropical America. In the Himalayas is the home of the giant rhododendron. Orchidaceous plants are markedly numerous, and the upper floral zones of the mountain range have furnished the most valuable types to the floriculturist.

Fauna. The country forms a part of the Oriental Region (q.v.) of zoögeography. Although the plains of the northwest partake of the characteristics of Central Asia, India possesses the lion (in the northwest, but now nearly extinct), the wild ass, and sundry smaller mammals, birds, and reptiles that belong rather to the country westward. The massive ranges of the Himalaya also contain a peculiar montanic fauna, characterized especially by an abundance of wild sheep, goats, and of goat antelopes (qq.v.), such as the Charal Pulis sheep, the ibex, markhor, goral, and others elsewhere described. These, too, are more closely related to Palæarctic than to Oriental forms; but two or more species of goats exist on the Nilgiri Hills and other heights of the peninsula. The forests, swamps, and grassy plains of peninsular India support life in extraordinary profusion, and civilization seems to have little effect upon it because of the jungle fastnesses to which animals may everywhere retreat and be safe. The elephant (which is still met with in many parts in large herds), however, requires protection, and the wild cattle are becoming scarce. Several kinds of deer, including the sambur, axis, and swamp deer, and several kinds of antelopes are numerous, as well as very many of the minor mammals.

India is the home of the gallinaceous tribe of birds and is rich in many kinds of pheasants, partridges, and jungle fowl (to which is traced the origin of domestic poultry), besides a rich avifauna of the woods and fields. With this plenitude of prey, to which may be added a great variety of fresh-water and marine life, including many valuable food fishes, there would naturally be found carnivorous beasts, rapacious birds, and poisonous predatory reptiles. The tiger (which is probably indigenous to India), leopard, cheeta, and several lesser cats wander throughout the whole country, but are in greatest abundance in the sub-Himalayan forests, the marshes of the Gangetic delta, and the hill country of Central India, and are dangerous to man as well as beast. Other animals are the rhinoceros, gayal (or bison of the Ghats), bear, jackal, and various forms of ape. The true buffalo, as well as the camel, is domesticated and is largely used in the service of the field and farm. India is famous also for venomous snakes (see COBRA; ETC.), crocodiles, and sea snakes. The deaths of human beings by wild beasts and snakes number thousands each year, and the loss of cattle reaches hundreds of thousands of dollars in value. On the other hand, India is one of the most attractive regions of the world for sportsmen, who annually distribute much wealth within its confines.

Geology. The topographic divisions of India with their characteristic features are based largely upon differences in geological structure. The main system of the Himalayas, so far as explored, has been found to be composed of crystalline strata—gneisses, schists, and igneous rocks of Archean age—which show the effects of upheaval and folding during the great crustal movements that elevated the ranges in late Tertiary times. In the southern flanking chains, or sub-Himalayas, the most prominent formation comprises Tertiary sandstones, conglomerates, and clays, in disturbed position. These strata (the Siwalik group) are enormously developed and contain a remarkable assemblage of fossil mammals. The great river plains of India occupy depressions in sedimentary strata, mostly of Eocene age. The Deccan plateau, especially in the north and west, is formed largely of basalt which poured out from great fissures during the Cretaceous period. These basaltic sheets occupy an area estimated at 200,000 square miles and attain a vertical thickness of several thousand feet. The Vindhya Mountains on the north have a gneissic axis, with Paleozoic sediments on the flanks. East and south of this range there is a large area underlain by sandstones and shales, to which the name Gondwana system (Mesozoic) has been given. This group extends probably from the Permian to the Jurassic period; its fossil fauna and flora are more nearly allied to the life forms of South Africa and Australia than to those of the Eurasian continent.

Mining. Considering the extent of area and the large population, the mining industry is strikingly insignificant, though the recent developments are beginning to give it some importance. Increased utilization is being made of the coal resources of the country, much to the advantage of the railroad and milling interests. The annual output of coal increased from 2,562,000 tons in 1893 to 14,706,000 tons in 1912. The provinces of Bengal, Behar, and Orissa produce over nine-tenths of the total product, the output having grown from 1,915,000 tons in 1893 to 13,432,500 tons in 1912. The increased production has resulted in the decrease of the imports of coal and coke, which amounted to £778,000 in 1913, and the increase in the exports of coal, amounting to £589,000 in 1913. Coolie labor is prominent in the working of the coal mines.

The mining of gold is important, the yield having steadily increased from 107,273 ounces in 1890 to 631,116 ounces in 1905, but has since declined to 590,555 ounces in 1912. The greater part of this is mined from the quartz deposits of Mysore, although some is obtained from river gravels in the Himalayas and elsewhere. A parallel growth is being made in the production of petroleum, the output in 1900 having been 37,729,000 gallons, and, in 1912, 249,083,500 gallons, the greater part of which was obtained from Upper Burma. The importation of mineral oil, which was in 1900 more than twice as great as the home production, amounted in 1912 to less than one-half of it (107,416,500 gallons). The government has long maintained a monopoly in the production of salt. It is obtained mainly by the process of evaporation, and the industry is carried on along the coast region and at some of the interior lakes. The annual yield is about 1,300,000 tons. Saltpetre is obtained in the plains, lead and copper are mined in the Himalayas, manganese ore in Bombay, and tin and rubies in Burma. India was long famous for its diamonds, but the output in the last century has shrunk into insignificance.

Agriculture. This industry, which has always been the principal source of subsistence for the people of India, is increasing in importance under British control. This is due largely to the increase in facilities for irrigation and for the transportation of agricultural products. Famines, which in the past resulted in an enormous loss of life, are now much less frequent and severe, owing to the increase in food supply and better facilities for distribution by rail and upon the rivers and canals. The same system of distribution has led to an increased supply of manufactures produced by the factory system of Great Britain and the manufacturing centres of India, and this has in turn increased the percentage of the population devoting its attention to agriculture. The land of India, though varying in composition, is generally fertile and is very productive, being aided by the tropical climate. The country is, however, in continuous danger of crop failure by the general uncertainty of rainfall. Practically the only districts exempt are the southwest Malabar coast, the deltaic district of the Ganges, Brahmaputra, and Burma. (See section on *Climate.*) In some regions, as in the lower Ganges valley, the precipitation is ordinarily quite heavy, rarely failing to meet the needs.

Irrigation. From remote times the inhabitants of India have sought, by means of artificial water supply, to protect themselves against the calamities of drought. Under British control the irrigation works have been enlarged, and new ones constructed on an enormous scale. In 1911–12 there were 40,679,000 acres, one-sixth of the total crop area, under irrigation. The area actually irrigated varies with the lack of rainfall from year to year, and the commercial value of irrigation schemes varies in different sections. In Sind and Lower Punjab irrigation is necessary every year. In the valley of the Indus the necessity for irrigation decreases with the distance from the Himalayas, but the system is used as a protection against drought years and to supplement the rainfall of average years. This is true also of the upper Ganges region. In the lower Ganges valley, as indicated above, irrigation becomes less and less necessary towards the deltaic region, in portions of which the danger of drought gives place to that of inundation. In Madras (except the west coast) and the Deccan or Central India region irrigation is a practical necessity as a protection against frequent droughts and to supplement the usual rainfall. On the east coast of Madras, especially where "wet crops" principally are grown, irrigation is an absolute necessity. In Orissa and Upper Bengal, though the ordinary rainfall is quite adequate and droughts seldom occur, the government has constructed irrigation works as a safeguard against dry periods. These works are considered indirectly profitable to the government, however, since they obviate the loss of land revenue and the expense of supplying a famine-stricken district with food during a drought year. The Orissa and some of the other canals are also valuable for navigation.

The sources and methods of irrigation vary throughout the country. Before the British occupation wells were used chiefly, and have continued to increase in absolute, though not in relative, importance, because, where practicable, they constitute the cheapest method. They are generally employed by private enterprise and are still the largest source of irrigation in the United Provinces of Agra and Oudh, and Gujarat. Reservoirs, generally called tanks, have been used since ancient times to furnish water for irrigation and are especially adaptable to broken, hilly regions, where the construction of a long system of canals is impracticable. They are found chiefly in the eastern portion of Madras, where they vary in size, according to the supply of water and the irrigable area which they command. In many instances they are dry during a part of the year, and crops are sometimes raised in them. This tank system is also carried on by private enterprise. But since India has been in the hands of the British the greatest progress in irrigation has been accomplished through the general and uniform extension of the canal system.

This method also was used in ancient times, but some of the more important systems had fallen into disuse when the British took possession. Their construction requires heavy outlays of capital and presupposes a stable form of government. The numerous legal complications which rise out of such an undertaking, and the relation of the government to the land, together with the necessity of constructing certain systems having no remunerative financial value, have all led the British government to take the system almost wholly in its own hands. The execution of this method requires a fairly level area. The methods used for the application vary in different localities. In the Madras deltas dams are constructed across the rivers at their entrance to the delta region, and, since their beds are almost on a level with the surface of the land, water is easily diverted into artificial channels. They yield their main supply during the annual flood period, and the region dependent upon them is therefore limited to one crop. In the Lower Punjab and Sind the channel of the Indus River lies so far below the surface of the riparian country that its waters cannot easily be diverted by dams. Through the high banks deep cuts are made, and "inundation canals" are constructed, which convey the water of the river during the flood period. By this means the land is watered sufficiently to produce one crop a year. The valleys of the upper Ganges and upper Indus are also too deep and broad to admit of damming, nor would the inundation system of the lower Indus answer the purpose. Some of the crops that are commonly raised and require irrigation grow in those seasons during which the rivers are at their lowest. For their irrigation canals are dug so as to strike the rivers where they emerge from the mountains. The channels conduct the water along the watershed of the plains, finally reuniting with the main streams. Some of these canals are notable both for their great length and capacity. Many of them are remarkable feats of engineering, owing to the difficulties surmounted in their construction, such as the crossing of other streams. In no part of the world is the irrigation system so thoroughly developed or made to add so much to the producing power of the country as in India, and this has been largely developed under British rule. Of the 40,000,000 acres under irrigation nearly one-half is irrigated by canals and about one-fourth from wells. Over one-half of the area irrigated in 1912 was supplied from government works, and the value of the crops grown on irrigated lands was approximately $150,000,000.

A table herewith presented shows the area in the different provinces irrigated during the years 1911–12, the relative importance of the different sources of irrigation, and the proportion of irrigated land to the total crop area. It will be seen that the Punjab is the most, and Assam the least, dependent upon irrigation.

AREAS IN ACRES UNDER IRRIGATION IN 1911–12

ADMINISTRATIONS	Total area under crops	AREA IRRIGATED					
		By canals		By tanks	By wells	Other sources	Total area irrigated
		Government	Private				
Bengal	30,436,800	111,323	244,381	728,104	20,773	565,262	1,669,843
Behar and Orissa	32,955,600	797,679	334,455	628,894	625,858	1,458,083	3,844,969
Assam	6,167,760	978	119,093	....	....	196,613	316,684
United Provinces, Agra	32,760,757	1,971,333	20,521	48,555	2,974,843	1,308,378	6,323,630
United Provinces, Oudh	12,030,224	....	....	....	899,940	712,544	1,612,484
Punjab	26,308,442	6,964,439	420,002	7,435	3,420,444	142,282	10,954,602
Northwest Frontier Province	2,688,888	221,087	439,344	....	83,913	97,273	846,617
Upper Burma	5,017,166	419,792	204,484	135,786	8,104	80,848	849,014
Lower Burma	8,725,818	396	21,790	3,505	2,218	78,729	106,638
Central Provinces	20,294,576	12,813	1,879	427,768	58,796	23,185	524,441
Berar	7,069,777	....	....	238	31,882	521	32,641
Ajmer-Merwara	253,496	....	....	25,134	91,190	51	116,375
Coorg	142,135	2,610	....	1,840	....	....	4,450
Madras	37,380,133	3,534,827	179,604	3,298,685	1,442,280	1,131,482	9,586,878
Bombay	23,499,345	146,705	15,936	58,256	696,365	87,920	1,005,182
Sind	3,263,325	2,636,845	66,939	....	46,685	134,092	2,884,561
Pargana Manpur	7,509	....	....	....	133	....	133
Total	249,001,751	16,820,827	2,068,428	5,364,200	10,408,424	6,017,263	40,679,142

Crops. In 1911–12 the area actually cropped was 215.981,683 acres, and the current fallow 54.982.324 acres. The estimated area of the cultivable waste for the same year was 114,700,370 acres. There were 149,605.179 acres not available for culture, and 80,851,368 acres under forest. For crop statistics, see accompanying table.

The kind of crops grown is determined largely by the amount of the water supply. In regions where the rainfall is excessive, or an abundant supply is readily obtainable, rice is almost the only crop. It is therefore confined largely to the deltaic regions and especially to the Bengal delta. Here the annual overflow of the rivers makes irrigation easy. From the accompanying table will be seen the great importance of rice in Bengal, Lower Burma, and Assam. The consumption of rice is, however, not nearly so universal in India as is popularly supposed. It is not the cheapest food, and in many regions only the wealthy classes can afford it, while even in Bengal there are great numbers of the lowest classes who use but little. Sir William Hunter estimates that it is the staple food of less than one-third the total population of India. The main crop is reaped in the early winter—November to January—but in Bengal there is also a summer crop. A considerable share of the rice crop is exported, the value of the rice exports in 1912–13 being nearly twice as great as those of wheat and showing a larger total than that of any other single product. Throughout the dry, nonirrigated portions of India millet is the commonest food crop and is the largest item in the food of the lower classes over the greater part of the country, being most used in the southern districts. Practically the whole crop is used for domestic consumption, whereas rice is exported in large quantities. The planting and harvesting periods vary with different sections; in some regions two crops are raised, and in others, especially in the northwest, but one crop is produced, the rainfall being the controlling factor. The acreage shown in the accompanying table represents the area sown, but the area cropped falls short of this. After rice and millet pulse is the most important food product. There are no available figures showing the acreage devoted to millet.

CROPS, IN ACRES, UNDER CULTIVATION IN 1911-12 (ADD 000).

ADMINISTRATIONS	Rice	Wheat	Barley	Millets, jawar, bajra, and ragi	Maize	Pulse	Total food grains and pulses	Oil seeds	Sugar cane	Cotton	Indigo	Opium	Tea	Coffee	Tobacco	Total area cropped	Area cropped more than once	Net area dealt with according to survey
Bengal	20,961	143	95	23	95	177	22,910	1,888	223	34	1	...	146	..	306	30,437	5,506	49,646
Behar and Orissa	17,365	1,285	1,340	1,171	1,661	992	28,352	2,050	263	89	110	3	2	..	116	32,956	5,399	53,173
United Provinces, Agra	3,430	5,641	3,977	3,764	998	5,175	27,393	1,190	1,120	842	24	104	8	..	76	32,761	6,370	53,028
United Provinces, Oudh	1,844	1,995	1,238	941	796	1,697	10,959	337	221	60	6	111	...	..	18	12,030	2,830	15,307
Punjab	514	9,725	1,339	1,726	955	4,100	19,379	1,599	298	1,462	39	2	10	..	76	26,308	4,051	62,215
N. W. Frontier Province	47	1,199	296	129	410	174	2,355	105	32	56	...	...	...	..	12	2,689	404	8,438
Upper Burma	1,958	27	....	803	161	39	3,455	1,150	3	172	...	...	2	..	30	5,017	397	53,805
Lower Burma	7,937	.....	....	1	21	1	7,987	68	11	20	...	...	...	..	59	8,726	6	54,994
Central Provinces	4,780	3,291	23	1,733	142	993	15,312	2,981	23	1,392	...	...	...	..	18	20,295	2,326	52,592
Berar	41	320	....	2,322	2	117	3,419	296	1	3,256	...	...	...	..	8	7,070	12	11,372
Assam	4,616	.....	1	2	19	1	4,727	301	37	38	...	...	354	..	8	6,168	456	31,306
Ajmer-Merwara	.....	27	63	39	44	26	213	4	1	28	...	...	...	..	...	253	33	1,771
Coorg	83	.....	....	6	....	2	91	.....	....	.....	...	...	...	43	...	142	1	1,012
Madras	10,289	18	3	10,998	118	135	28,586	2,927	108	2,676	90	...	21	51	192	37,380	4,312	91,074
Bombay	1,682	984	38	11,309	165	422	17,364	1,357	67	4,107	...	...	...	..	68	23,499	593	48,629
Sind	1,089	368	19	805	2	76	2,591	240	4	336	5	...	...	..	10	3,263	322	30,257
Pargana-Manpur	.....	2	....	2	1	1	6	1	....	1	...	...	...	..	...	8	.....	31
Total	76,637	25,025	8,432	35,775	5,591	14,129	195,097	16,495	2,410	14,568	275	220	544	95	999	249,002	33,020	618,606

Wheat is confined largely to the northwestern part of India, being the chief crop in the Punjab. It is a very important factor in the agriculture of Bengal and Behar. While there was formerly much apprehension in the United States that the wheat crop of India would drive that of the former from the world market, recent developments have not justified such fears, since the increase in area devoted to wheat in India was much less in recent years than formerly. The wheat-producing area formerly varied widely from year to year. The average, including native states, for the last decade was about 30,000,000 acres, about half of which is subject to irrigation. The average yield per acre varies with climatic conditions—in the Punjab it is about 13 bushels. The harvest occurs during April and May. Potatoes and other root crops are grown successfully, but they are not so favorite a food in India as in European countries. A large variety of tropical or semitropical fruits are grown for local consumption. The coconut is the most important export from the southwest coast. There are several kinds of dates having a local and commercial importance. Throughout India the raising of oil seeds receives much attention, an average of about 14,000,000 acres being devoted to their cultivation. The product has been for a long time an important item in local consumption, and in the last half of the nineteenth century large quantities were exported to Europe—the foreign demand giving an increased impetus to its cultivation.

Sugar cane is grown in most provinces, especially in the United Provinces of Agra and Oudh, the Punjab, and Bengal. The crop requires irrigation and cultivation on a capitalistic scale, which tends to limit the development of the industry. The quantity of sugar produced in India is very large, about 6,000,000,000 pounds in 1913, but it is practically all consumed in that country and is not sufficient to meet local requirements, the imports amounting to about 1,365,000,000 pounds in 1913 valued at 140,000,000 rupees. India is thus one of the largest sugar-consuming countries of the world, her consumption aggregating about 7,350,000,000 pounds against 8,250,000,000 in the United States. The production of coffee is mostly restricted to a limited area in the elevated region on the southwest coast, the coffee lands of Mysore, Coorg, the Madras district of Malabar, and the Nilgiris, comprising over 85 per cent of the whole area under coffee in India. The coffee exports amount to about 15,000,000 rupees annually. The culture of tea is due to the fostering efforts of the government. Tea culture was introduced about the middle of the nineteenth century and has continued to increase and is now one of the important crops of India. The quantity produced is about 350,000,000 pounds, and the quantity expended about 280,000,000 pounds. The value of the tea exports amounted to about 132,000,000 rupees in the fiscal year 1913, or nearly 10 times as much as the coffee exports. Requiring an abundance of water, it is best adapted to Assam and Lower Bengal and is largely confined to these two regions, being grown for foreign markets rather than home consumption.

Opium is a government monopoly, and its production is restricted to certain regions, principally Behar, the country around Benares, and Oudh. The poppy plant, from which the opium is obtained, requires irrigation and careful attention. The production, however, is rapidly declining, owing to the coöperation of the Indian government with that of China in the prevention of imports of opium into China. Some tobacco is grown in most parts of the country for local consumption. About half of the total product is grown in Bengal, and part of it is exported. The tobacco is generally inferior to that grown in other countries and therefore does not compete seriously in the European market. Indigo has ceased to hold its own even in absolute importance. The acreage for 1912 was but two-fifths of that for 1904. The industry has suffered from competition with various substitutes, and with the product grown in Java. Bengal (particularly Behar), the United Provinces (Agra), and Madras lead in its production. Spices are raised and exported, but are of minor importance. During the past 60 years there has been a considerable increase in the production of fibrous plants—cotton and jute.

LIVE STOCK IN 1911-12

PROVINCES	Cows, bulls, and bullocks	Buffaloes	Young stock: calves and buffalo calves	Horses and ponies	Mules and donkeys	Sheep and goats	Camels
Behar and Orissa,	10,391,208	2,161,008	3,135,611	162,868	25,169	4,517,101	327
Agra	11,777,676	3,150,300	6,675,799	362,574	266,247	7,160,463	13,443
Oudh	5,248,633	1,100,401	2,469,947	144,337	47,283	2,847,193	3,100
Punjab	7,635,443	2,866,084	3,821,389	360,502	622,546	9,844,785	270,522
N. W. Frontier Province	758,946	162,509	294,414	26,790	121,737	1,198,084	40,574
Lower Burma	1,430,932	549,830	635,084	20,455	7	75,392	......
Upper Burma	2,085,948	215,593	810,619	60,287	861	140,686	......
Central Provinces	5,743,714	1,108,051	2,408,169	107,024	19,952	1,351,306	228
Assam	1,602,380	263,205	849,324	10,978	....	591,630	......
Ajmer-Merwara	171,767	35,584	55,399	2,436	6,254	464,298	1,500
Coorg	86,947	23,338	39,200	314	220	2,550	......
Madras	11,164,958	3,450,161	5,474,278	53,425	135,375	18,178,212	45
Bombay and Sind	5,631,980	1,400,678	2,644,475	196,691	177,443	5,397,061	116,690
Berar	1,417,761	263,503	495,532	31,211	23,608	633,084	339
Pargana-Manpur	4,070	980	1,362	53	135	1,050	......
Total	65,152,363	16,751,225	29,810,602	1,539,945	1,446,837	51,402,875	446,768

Cotton had long been raised, but had not been drawn upon to supply the foreign market to any great extent until the Civil War in America stopped the supply from there. A reaction soon followed its rapid and extensive development, and though it subsequently increased again, it now produces about 3,500,000 bales annually. Cotton cultivation is not confined to any distinct region, but is relatively most important about the centre of the peninsula in Berar. The soil of this and the surrounding country is called the "black cotton soil" and is noted for the remarkable extent to which it holds moisture. The cotton is a short-staple grade and therefore inferior to the American and Egyptian products. The exports average about 2,000,000 bales annually. The production of jute is more restricted in extent, the plant growing best in the flooded lands along the lower Ganges and Brahmaputra in Eastern Bengal. The average annual acreage for the last decade was over 2,000,000 acres, and in 1913 it was 3,354,000. Like cotton, the product is largely exported, though there is not so large a per cent of it exported in the raw state. The exports of jute in the raw state are about equal in value to those of the manufactured product. A considerable part of the product is shipped to the United States. Silk culture is important in the Punjab, Assam, and Lower Bengal.

The methods of cultivating crops in India are such as have prevailed for centuries. The natives show little inclination to take suggestions from the British. The efforts of the latter, however, to accomplish results by means of experimental farms have resulted in a considerable improvement in methods of cultivation and in some cases have increased production per acre. There are experimental and seed farms conducted by the Department of Agriculture, the introduction of new crops and new appliances, and especially the enlargement of the irrigated areas.

Stock Raising. While India has a larger number of cattle than any other country of the world, they are of a low value as compared with those of other countries and do not form an important factor in commerce. A number of conditions are responsible for the unsatisfactory state of stock raising. The people are given almost wholly to a vegetable diet. Religious or caste prejudices prevent the greater portion of the Hindus from eating beef or pork. The period preceding the annual rains is characterized over a large portion of the country by a scarcity of both water and pasturage, and stock are generally reduced almost to starvation. This tends to make the breeds deteriorate. The disregard of proper methods in breeding has a similar influence. The grade of stock, therefore, is generally very inferior. Over the greater portion of British India cattle serve the same purpose that horses do in most countries. The breed of cattle is one that is unknown in this country, being of the humped variety. Buffaloes are also used as work animals throughout almost all India. They are somewhat hardier than cattle and thrive in districts climatically unfavorable to the latter. Mules and donkeys are about equal in number to horses and ponies, the former being raised in the largest numbers in the Punjab and the latter in Agra.

In the dry regions of the Lower Punjab and Sind camels are still the principal domesticated animals. In a few localities elephants are of great value in performing certain kinds of work, but their number and use are much more limited than is popularly supposed. The grazing industry is best represented in the raising of sheep and goats. These animals are valued chiefly for their wool. Pigs are raised, but their number is not recorded in the government reports. The table on page 64 shows the number of domestic animals by provinces for the year 1911–12, with the sole exception of Bengal, for which complete data are not available. Compared with the figures of a decade earlier a slight increase is found for almost every variety in most of the provinces.

Famines. From the earliest historical times India suffered often and terribly from famines, but this suffering has steadily decreased with better transportation facilities and the greater facilities for irrigation. Under British administration irrigation works have even been extended into districts where the rainfall is usually sufficient. Irrigation, however, sometimes fails, in cases where the precipitation may not be great enough to supply the reservoirs or keep the streams full enough to supply the irrigation canals.

The work of reducing the probability of distress from famines has constituted a large part of the work of the British government in India in recent years. Elaborate preliminary preparations are made in fear of their recurrence. The work is carefully systematized and officered. The country is districted, and in each district an examination is made of such matters as the water supply, the social condition of the people, the probable extent of need in case of famine, and public works. The budget makes annual provision for forest care and improvement and for the care and enlargement of the irrigation systems.

The loss of life from starvation is now much less than formerly, but deaths from diseases which so frequently accompany the famine are generally greater than by actual starvation. One of the most difficult tasks of the government during the famine period is to enforce necessary sanitary regulations. However, taking one year with another for the whole country, the loss of life from famines constitutes but a small per cent of the total death rate. The ravages of disease in India are not peculiar alone to famine periods. The climatic and sanitary conditions give rise to pestilences which at intervals carry desolation over the country. Hospitals, richly endowed and admirably regulated, supported by government as well as by private munificence, exist in all the large towns; and great efforts are constantly made to bring the benefits of medical skill and knowledge within reach of the poorer classes. In all parts of the country dispensaries have been opened where medicines are given out and patients advised. Several millions of persons are vaccinated annually in India. Mortality is aggravated by the passion of the people for pilgrimages. All ages and both sexes each year travel vast distances for their devotions and die by hundreds on the route.

Manufactures. For centuries India has been noted for its beautiful fabrics and metal work, made chiefly in the houses of the natives. But most native Indian industries are of a primitive type, and in a society so thoroughly impervious to the spirit of progress their modification and improvement have been impossible. Consequently the development of the factory system in England made it possible to manufacture products much more cheaply than could be done by the laborious methods of Indian workmen. In addition, improvements in transportation facilities have enabled European manufacturing centres to command a large part of the Indian market, with the result that in the home market in some localities, and in some outside markets, the Indian products have been almost entirely supplanted, and this has led to an increase in the number of people devoting their attention to agriculture. The enormous growth of the imports of cotton manufactures is suggestive of the extent to which the native industry has been supplanted. The value of cotton manufactures imported into India is now approximately $200,000,000 annually and exceeds by far the cotton-goods imports of any other country of the world. The exports of cotton yarn, however, amount to about $33,000,000 annually, mostly going to China and other Oriental countries.

The most important manufacture is that of the coarser grades of cotton. The average number of hands employed in the cotton mills increased gradually from 53,624 in 1883 to 112,000 in 1890 and 221,000 in 1912, while the number of mills increased from 62 in 1883 to 234 in 1912. About three-fourths of this industry centres in the city of Bombay. A similar increase was observed in the jute and hemp industry, which in 1912 employed 201,324 hands, as against 42,797 in 1883. It centres in the region about Calcutta. Among the other more important establishments are woolen, paper, flour, rice, oil, and lumber mills, the breweries, coffee works and indigo and sugar factories. The total number of factories liable to inspection under the Factories Act in 1911 was 2248, employing 629,227 men, 115,090 women, and 47,627 children. The Province of Bengal employed over a third, and Bombay nearly a third, of the total force. Among other manufactured Indian products are silk (including beautiful figured stuffs), various articles of luxury, such as highly wrought work in ivory, gold, silver, copper, and brass, cashmere shawls, etc. In weaving and in carving and inlaying wood and ivory the native artisans are unsurpassed.

Transportation and Communication. The network of railways to be seen on a map of India presents a decided contrast with the sparsity of railway lines in other parts of Asia or the tropical world. The mileage for British India is three-fifths the total for all Asia. The development of the railway system was prompted by a number of motives and has been prolific and far-reaching in results. The military exigencies, development of the resources of the country, extension of British trade, and humanitarian sentiments or the desire to lessen the horrors of famine have each played varying parts in determining the location of lines and methods of administration. The results show that each of these efforts has been abundantly justified. Closely allied with the influence of the railway system as an economic factor has been its socializing influence—the beginning of the transformation of the native society, a lessening of the rigors of caste, and at least a portend of a reconstructed civilization along more modern and progressive lines.

Railway development in India has been in the main in harmony with a policy laid down as early as 1850 by Lord Dalhousie. This policy comprehended the construction throughout India of a system of grand trunk lines with a uniform gauge, connecting all the large centres of industry and population, and the construction of subsidiary or feeding lines with a narrower gauge and on a less expensive scale. The grand trunk lines were accordingly begun in the early fifties under a system of government guarantee. The constructing companies were guaranteed 5 per cent on the capital invested for a period of 25 years, and at the end of the contract period the government had the right under specified conditions to take possession of the lines. The policy attracted capital to the country and led to a more rapid railway construction than would have been secured by state construction. The guarantee, however, led to some extravagance in expenditure and became a heavy burden to the government. A new policy accordingly was taken by the government in 1863–64, under which assistance was advanced to new lines, which in turn obligated themselves to perform certain duties for the state.

A third policy was introduced in 1870 under which new lines were built and operated directly by the government. The widespread and disastrous famines a few years later made it evident that new lines should be constructed faster than the government could assume financial responsibility for their undertaking and forced it to fall back upon private enterprise. New lines were built without regard to a uniform policy, the government generally extending a guarantee, but for as brief a period as possible. Meanwhile the contract period of four companies had terminated, and new contracts were made for another 25 years, according to which the state, allowing certain concessions, was to share in the surplus income above 5 per cent. But subsequently, at the expiration of other contracts, the lines have been acquired by the state. Though no settled system has yet been adopted for the administration of railways, it will be seen that the greatest mileage is included in the lines belonging to the government but controlled by private companies. In 1912 a little more than half of the total mileage, or 18,107 miles, was represented by government lines operated by companies; 2159 miles were owned by native states and operated by companies; 7018 miles represented state lines operated by the state; 2039 miles were owned and operated by the native states; 4013 miles were owned and operated by assisted companies; 74 miles were owned and operated by unassisted companies, and there were 74 miles of foreign lines. The total mileage increased from 16,380 in 1890 to 27,565 in 1904 and 33,484 to Jan. 1, 1913. The total capital expended on Indian railways to the end of 1912 amounted to rx. 476,925,000 (£317,950,000). In 1911–12 the net profit to the state, after paying interest and other charges, was £3,787,770.

The number of post offices in 1912 was 18,801, which was an increase of over 75 per cent against 1895, when the number was 10,714. The number of letters handled during the same period increased 145 per cent. The Imperial system of telegraph and the railway system have been united, and there is a uniformity of telegraph charges throughout the whole system, including 78,862 miles of line and 311,034 miles of wire (1913). The mileage of wire increased 55 per cent in the last decade. There are three grades of messages—the urgent, ordinary, and deferred. The charges are less for the messages delivered with the less speed. For a period of 10 years ending in 1912 the government realized an annual average of 2.30 per cent net revenue (based on the capital sum employed) after allowing for all working expenses. The number of paid messages in this year 1912–13 was 15,449,000.

Commerce. From the earliest periods of history India has held high rank in the trade of the world, having been a large producer of commodities that were highly prized in general commerce. The attempts of Portugal, Holland, and France to secure the largest share of India's trade form an important chapter not only of its own history but of that of the world. The desire to find a short route thither by sea furnished much of the impetus given to the spirit of exploration during the fifteenth century, of which the achievement of Vasco da Gama (q.v.) affords a conspicuous example.

In 1600 an English trading company, the East India Company (q.v.), joined in the rivalry and opened the way for the extension of English influence and power over the whole country. For over two centuries trade between England and India increased slowly. After the English East India Company was deprived of its monopoly in 1834 there began an epoch of rapid trade development. The abolition of the inland duties, the assumption of control by the English government, the construction of the Suez Canal, and the improvement of inland transportation have been most influential factors in accelerating this trade movement. The magnitude of the increase since 1834, in which year the total foreign exports by sea were less than £10,000,000, is shown pro tanto by the first table on page 67.

In the year ending March 31, 1914, the imports of merchandise on private account were valued at £122,167,103, and the exports and reexports at £166,041,434 (preliminary figures). The rate of increase has declined somewhat during the last decade. Since 1834, with few exceptions, the exports have annually exceeded the imports. A large proportion of the Indian foreign trade (about four-fifths of the imports and a little less than three-fifths of the exports) passes through the Suez Canal. Of this the greater share is with the United Kingdom. The figures for 1900 are: imports via Suez

Canal, £47,135,024, by other routes £9,413,838; exports via Suez Canal, £66,742,287, by other routes £33,013,762. Corresponding data are no longer published by the government. The accompanying table shows the amount of trade with other countries since 1869:

VALUE OF FOREIGN IMPORTS AND EXPORTS BY SEA, EXCLUDING GOVERNMENT STORES AND TREASURE

	IMPORTS			EXPORTS		
	Merchandise	Treasure	Total	Merchandise	Treasure	Total
1869–1870	£32,879,000	£13,954,000	£46,833,000	£52,471,000	£1,025,000	£53,496,000
1889–1890	46,000,000	11,600,000	57,700,000	69,300,000	1,010,000	69,310,000
1912–1913	107,327,024	34,132,003	141,459,027	163,909,589	4,697,193	168,606,782

VALUE OF PRIVATE MERCHANDISE TRANSPORTED TO AND FROM BRITISH INDIA BY SEA

COUNTRIES	IMPORTS		EXPORTS	
	1869–70	1911–12	1869–70	1911–12
EUROPE	£31,353,100	£71,123,777	£33,123,200	£85,992,491
United Kingdom	30,324,900	57,635,248	27,798,700	38,427,836
AFRICA	884,100	1,788,752	772,100	4,178,838
Egypt	* 48,500	162,200	* 1,128	1,137,334
AMERICA	105,200	3,529,682	1,629,200	13,194,239
United States	† 201,400	3,527,290	‡ 1,506,900	10,392,736
ASIA	13,719,800	15,209,391	17,919,500	42,173,436
‖ China	6,868,800	1,642,934	12,501,400	12,152,299
AUSTRALASIA	....	....	....	....
Australia, New Zealand	771,900	731,273	52,600	2,146,556

* 1871–72. † 1875–76. ‡ Western Hemisphere, not including West Indies. ‖ Including Hongkong and Treaty Ports.

It will be noticed from the table that the preëminence of the United Kingdom in the trade with India is waning as to exports. They have been reduced to less than a third of the total exports, while the imports from Great Britain are almost two-thirds of the total imports. The increase in the exports from India has been largely to other Oriental countries. The amount of American products sent to India has materially increased, but is still insignificant. The exports accredited to Egypt are intended largely for the Mediterranean trade. Among continental European countries Germany, Austria-Hungary, France, and Belgium are in the lead, the former being first in the amount of imports from India. In Asia, Java, the Straits Settlements, and Japan have a large trade with India.

Two cities, Calcutta on the east and Bombay on the west, have the only good, large natural harbors on the coast, and about three-fourths of the entire trade passes through their ports; the former being more prominent in exports and the latter in imports. Adequate harbor facilities have been secured at great expense at Karachi, and it now serves as a port for the Indus valley region. A harbor has been constructed at Madras and another at Rangoon—the port for the Irrawaddy valley region.

The large increase in commerce during the last century has been accompanied by a radical change in the quality of the trade, and considered from this standpoint the increase has not meant a corresponding growth in the welfare of the country. A large proportion of the trade during the earlier period was in manufactured products, especially manufactures of metals and textiles. But the factories of Manchester and other foreign places have in a large measure supplanted the hand labor of India. Textiles, once an important export, now far exceed all other imports and amount to one-third of the total imports. The exports have become predominantly those of raw materials; the imports have become almost wholly manufactured products. As manufactured cotton leads in the imports, so raw cotton for a long time has held high rank among the exports. Cotton exportation received a great impetus during the Civil War in the United States, but it declined materially after the war. In recent years the exports have increased again; in 1913 rice alone surpassed cotton in value. Nearly all the cotton goods are imported from the United Kingdom, but that country receives only a small part of India's exports of raw cotton. The exports of India were formerly distributed among the European countries, but of late years the demand from Japan rapidly increased; in 1911–12 it amounted to £9,475,689. The importation of cotton twist and yarn increased two-thirds during the last decade, and there was a slight decrease in the exports of that article. These exports in 1912 amounted to £5,060,097, over four-fifths going to China and Hongkong.

The other leading imported commodities are hardware, machinery, iron, steel, and copper, mineral oil, railway plant and rolling stock, woolens, and sugar. Great Britain has a practical monopoly for India in the supply of railway material and machinery, and it supplies also the larger part of other metal products, Belgium, of the other countries, sharing most extensively in the trade. Mineral oil is the principal import from the United States, Russia now furnishing comparatively little. Among several exports of relatively great importance, rice—the only export upon which export duties are levied—is the most prominent and fluctuates the least, reaching an average value in the last 10 years of about £12,000,000. Most of the rice goes to Egypt, the United Kingdom, Ceylon, and the Straits Settlements. During the last quarter of a century there has been a great increase in the exports of oil seeds to Europe, averaging for the last decade about £9,700,000. Exports of hides and skins, jute—raw and manufactured—and raw cotton increased very rapidly during the decade ending with 1913, reaching in that year values of £10,913,818, £33,281,187, and £18,740,816 respectively. Raw hides and skins and jute cloth constitute the principal exports to the United States. The amount of each increased enormously during the decade and far exceeds that sent to any other country. Exports of manufactured jute increased 150 per cent during the decade ending with 1912–13. Nearly all the tea exported (£8,630,952 in 1911–12) goes to the United Kingdom (£6,353,755 in the same year); it has become a formidable competitor with the Chinese product, the total exports of tea from India in 1912 being 279,230,000 pounds against 196,488,000 from China, 192,020,000 from Ceylon, 35,130,000 from Japan, and 23,668,000 from Formosa.

Opium, which is exported to China and the Straits Settlements, is decreasing in amount, the total value for 1913 being £7,481,088. This is largely due to the opposition by the Chinese government to its importation into that country. Exports of wheat fluctuate widely; the value for 1912, which was higher than for any year since 1905, was £8,898,972. Most of the product goes to the United Kingdom. From 1903 to 1913 exports of indigo declined from £803,788 to £146,755. Exports of coffee have also shown a tendency to decline, their value in 1913 being £1,043,503. Spices, which once were a large part of the exports, are now relatively insignificant. Treasure has long constituted one of the most valuable imports and has annually exceeded in amount the exports of treasure for more than half a century. The value for the period 1909–13 averaged over £27,000,000, nearly three-fourths of which was gold. Since the government stopped the free coinage of rupees in 1893 the net imports of gold have been gaining upon those of silver. The exports of gold and silver for the same period averaged over £4,900,000.

The imports and exports by land are not large, the totals for 1913 being respectively £6,919,558 and £6,330,715. Over two-fifths of the former and over one-fifth of the latter were to and from Nepal. The most important land imports were grain, pulse, timber, and provisions, while nearly one-half the exports were cotton goods. Native craft carry on an extensive coastwise trade, particularly along the coast of Bombay. The traffic along this coast amounts to over one-third of the total coastwise trade. The large inland trade increases with the development of means of transportation. The inland and the local trade are very largely in the hands of natives, there being certain sects or castes, as the Parsis of Bombay, who devote themselves especially to this branch of industry.

The foreign trade of India is done mainly in British vessels, the tonnage of these in 1912–13 amounting to 75 per cent of the total. In 1912–13 the total number of ships entered and cleared at the ports of India was 8737, with a tonnage of 17,452,000. This total was greater than that for the corresponding year of either of the two preceding decades. Germany and Austria-Hungary are the most important of the other nations represented.

Government. By an Act of Parliament which received the royal assent Aug. 2, 1858, Queen Victoria was declared sovereign of India, and various regulations were enacted for the better government of the country. In 1877, in virtue of an Act of Parliament passed in 1876, the Queen was proclaimed Empress of India. The Home Government of India is vested in a Secretary of State for India, who is a member of the English cabinet. He is assisted by an Undersecretary and a council of not less than 10 and not more than 14 members. The Indian Executive Government is administered by a Viceroy or Governor-General, appointed by the crown, and acting under the control of the Secretary of State for India. The Viceroy's term of office is usually five years, and he is assisted by a council of six ordinary members, appointed by the crown. Each of them has charge of a department of the executive. The Viceroy himself retains the oversight of foreign affairs and can overrule a majority vote of his council. The commander in chief is an extraordinary member of the council. This council, whenever it acts as a legislative body, is enlarged. It now has 68 members, 36 being official and 32 nonofficial. Within certain limits the council has power to make laws for all persons in British India, for British subjects in the native states, and for all native Indian subjects in any part of the world.

For purposes of administration, British India is now divided into 15 provinces. They differ in the method of their government. The three provinces of Madras, Bombay, and Bengal are under the rule of governors appointed by the crown and assisted by legislative and executive councils. The executive council consists of only three men. From 18 to 20 others are added to form the legislative council. These bodies communicate only with regard to important matters with the Home Government through the Governor-General. As regards affairs of minor importance, they correspond directly with the Secretary of State for India. The provinces of Behar and Orissa, the United Provinces of Agra and Oudh, the Punjab, and Burma are administered by lieutenant governors appointed by the Governor-General, subject to the approbation of the Secretary of State for India. These officers act without the aid of any executive councils, but have legislative councils of not more than 20 official members, nominated by the Lieutenant Governor on the approval of the Governor-General. There are a number of points upon which the local legislators in India cannot touch, and their proceedings are void if disapproved by the Governor or Lieutenant Governor, the Governor-General, or by the Home Government. The following divisions, viz., Central Provinces and Berar, Assam, Coorg, British Baluchistan, the Andaman and Nicobar Islands, the Northwest Frontier Province, Ajmer-Merwara, and Delhi, are under chief commissioners. There are no local councils for these provinces, such legislation as they may need being supplied by the Governor-General in legislative council. All the foregoing governmental divisions are subdivided into smaller divisions called districts, of which there are in all 267, varying both in size and population. The executive officer in each district is called the collector, magistrate, or deputy commissioner. This office is remarkable in that its powers extend over every department of administration. The officer has charge of the collecting of the revenue, of education, roads, sanitation, police, and jails, and he is judge both of first instance and of appeals.

It has been the policy of the British government to try to awaken a sense of civic responsibility among the natives, and it has encouraged the creation of the necessary machinery for local self-government. Much difficulty has attended the effort, owing to the absolute dominance which class distinction holds over the social order, making almost impossible the development of the idea of a mutual community interest. Some progress, nevertheless, is being made. Every province of India has since 1860 secured laws which place the administration of municipal affairs in the hands of local bodies. In small places these bodies are nominated from among the townsfolk, but in large places they are mostly elected. Under specified regulations the local bodies may raise funds or receive grants of public money for local purposes. In 1912 there were 714 of these municipal towns, containing an aggregate population of about 17,000,000. The total income of these towns for the year mentioned was about £8,600,000. The rural regions have also been supplied with district and local boards for purposes of self-government. In 1912 there were 731 of these boards, including a total of 5780 elected members and 7098 ex-officio and nominated members. The income of these rural regions for the year mentioned was £3,430,000. The probability of the development of a national representative native government is scarcely conceivable. The idea of a common country or a national life does not exist. The masses are ignorant of even the geographical conception implied in the name India. There is, it is true, a national native congress, which meets annually, but it is scarcely representative in any true sense or indicative of any popular national tendencies.

There are high courts of jurisdiction at Calcutta, Madras, Allahabad, and Bombay, appointments being made to them by the Home Government. These courts have a general oversight of the lower courts and are courts of appeal, but there is an ultimate appeal to the judicial committee of the Privy Council in England. The Punjab has a chief court, and the Central Provinces and Berar, Oudh, Northwest Frontier Province, Coorg, Sind, Upper Burma, and Chota Magpur have each a judicial commissioner. Lower Burma has a chief court. The great majority of the magistrates in the courts of original jurisdiction and of the civil judges are natives. Europeans have certain privileges in court not possessed by natives.

Finance. In the consideration of Indian finance regard must be given to the denomination in which the estimates are made. If estimated in pounds, as in the table on page 70, there is an apparent decrease in most of the noncommercial items of revenue and expenditure. On the contrary, if estimated in rupees, most of them show a very decided increase. The depreciation in the value of the rupee, as measured in gold, accounts for this difference; but since the burden upon the taxpayer is determined by the local purchasing power of the rupee, the question of the effect upon the welfare of the native is a subject of dispute.

Leaving out of account the productive enterprises of the government, which are largely self-supporting, it will be seen that customs and excise play a minor part in the support of the government, while land revenue has contributed on an average considerably over a fourth of the total amount. The stamp, salt, and opium revenues also play a conspicuous part. The land revenue, however, is not absolutely nor relatively so important as formerly. This revenue partakes of the nature of a rent as well as of a tax. The rent varies with soil and the distance from the town, but averages about 1s. 10d. per acre for the total acreage of cultivated land. The opium revenues are secured mainly from the monopoly of the industry in east India, and the export duty collected in west India. An increase in the salt duties in 1888 established the rate of 2½ rupees per maund (see paragraph on *Weights and Measures* below), but the rate has since been reduced to 1 rupee (March 20, 1907). The collections from stamps are principally obtained from court fee stamps. The largest item in the excise revenue is that collected from the manufacture of spirits, but other sources, as, e.g., the monopoly for the sale of liquors and intoxicating drugs, help to swell the amount. The interests of British trade have determined the policy of keeping the import duties—especially those on cotton goods—at a minimum figure, though the natives have at the same time demanded tariff protection. The general customs duties of 5 per cent existing prior to 1882 were abolished in that year, except those on salt, opium, wine, beer, spirits, and arms. In 1894 a 5 per cent ad valorem was reimposed, except on machinery and a few other articles; but two years later the duty on woven cotton goods was reduced to 3½ per cent ad valorem, and cotton yarn was exempted from duty. A corresponding excise duty is levied on the products of Indian cotton mills. From 1886 to 1903 an income tax was assessed upon incomes exceeding 500 rupees; in the latter year the taxable minimum was raised to 1000 rupees.

In the last two decades of the nineteenth century the budget yielded a surplus for 12 years of the period and showed a deficit for eight years. The heaviest drain upon the Imperial Exchequer is made by the military charges. They are followed closely by the cost of the civil service. Both of these items, according to the consensus of native opinion, are unnecessarily burdensome upon the country. The army charges are irritating because the natives consider the army too large, and particularly because of the large proportion of British soldiers who monopolize most of the best positions, and whose salaries and pensions are largely taken or sent out of the country. The civil service excites native criticism because of the practical monopoly exercised by the English over the higher offices and the excessive salaries attached to them. A few English officers receive an aggregate remuneration considerably greater than that given to the numerous native minor officials. The control of the opium, customs, post office and telegraph, tributes, mint and currency, receipts and the expenditure under the heads of army and military works, political relations, public debt, and certain trunk railways, is retained by the central government. The management of all provincial revenues and some of the Imperial revenues is delegated to the local governments.

The accompanying table gives a statement of the average annual expenditure for the two decades indicated and the year 1911-12:

DETAILS	1881-90	1891-1900	1911-12
Direct demand on revenue	£9,198,111	£6,797,206	£8,670,174
Interest	4,600,546	2,480,488	2,037,735
Salaries and expenses of civil service	12,277,556	9,916,049	16,466,166
Miscellaneous civil charges (pensions, allowances, etc.)	4,597,045	4,441,431	4,898,823
Famine, relief and insurance (including construction of protective railways, etc.)	931,379	1,141,481	1,000,000
Buildings and roads, military works	5,279,111	3,862,520	6,814,433
Army services	19,484,591	15,585,835	19,536,546
Special defense works	275,255	152,685	4,706
Post office, telegraph, and mint	2,126,871	1,736,072	3,218,911
Railway revenue account	14,953,786	14,487,566	29,849,004
Irrigation	2,380,082	2,025,011	3,174,883

The total average in round numbers for each decade is respectively £76,300,000 and £62,600,000. The total for 1912 is £96,640,465.

The accompanying table shows the average annual revenues for each of the three decades indicated and for the year 1911-12.

DETAILS	1871-80	1881-90	1891-1900	1911-12
Land revenue	£21,100,759	£22,496,636	£16,869,344	£20,764,697
Opium	8,936,068	9,176,138	4,591,820	5,961,278
Salt	6,383,315	6,885,891	5,764,241	3,391,212
Stamps	2,802,489	3,643,720	3,063,493	4,815,129
Excise	2,463,086	4,088,094	3,638,876	7,609,753
Customs	2,558,202	1,504,890	2,283,491	6,468,567
Interest	520,793	792,203	608,327	1,448,741
Receipts by civil departments	981,740	1,468,413	1,115,376	1,228,131
Miscellaneous	457,045	1,076,186	525,298	813,076
Building and roads, military works	....	605,741	447,953	490,615
Receipts by army department	....	1,762,080	603,187	1,179,366
Provincial rates	575,946	2,948,487	2,426,251	548,680
Assessed taxes	527,345	905,669	1,198,645	1,652,878
Forest	594,910	1,071,281	1,115,425	1,952,179
Tributes from native States	720,079	721,006	552,748	595,005
Registration	....	300,133	284,843	445,862
Post office, telegraph, and mint	1,278,055	1,911,061	1,951,095	3,588,804
Railways	2,519,049	12,997,363	13,922,181	33,636,774
Irrigation	552,189	1,677,791	1,838,804	3,980,052

The total average for the decade 1871-80 was £55,000.000; for 1881-90, £75,000,000; and for 1891-1900, £62.800,000. The total for the year 1912 was £100,580,799.

Debt. The permanent debt of India gradually increased from £33,577,414 in 1842 to £51,327,958 in 1857, when it rapidly grew in consequence of the Indian mutiny, and stood in 1862 at £97,037,062 and gradually increased to £276,295,677 in 1912. Of this last amount, £93,309,080 was held in India and £182,986.597 in England. The greater part of the debt in India bears interest at the rate of 3½ per cent, and about one-half the debt in England bears interest at the same rate, the remainder paying interest at the rate of 3 and 2½ per cent. Besides the above there were various special loans and other obligations assumed in India for savings banks, departmental and judicial deposits, etc., which brought the total liabilities up to £303,680,800 in 1913. The total interest for 1912, amounting to £9,884,812, was distributed as follows: railways, £6,664,210; irrigation, £994.235; ordinary debt, £1,435,152; and other obligations, £602.583.

Currency. In British India accounts are kept in rupees, annas, and pies—16 annas making one rupee and 12 pies making one anna. Beginning with the early seventies, the rupee was subject to great fluctuation in value, with a general downward tendency. The burden of taxation was greatly increased in consequence of the great fall in the value of silver, the Indian revenues being raised in silver, while the amount spent in Great Britain on account of India was paid in gold. This sum is disbursed in the payment of fixed charges, such as salaries and pensions of civil and military officers. The difference between the exchange value and the market value of the rupee became so great that the number of rupees raised by the government had to be increased by one-half. The financial embarrassment thus caused led the government in 1892, when the exchange value of the rupee sank to 1s. 1d., to consider a plan for the closing of the Indian mints to the coining of silver. In June, 1893, a law to this effect was passed, and the rate of 1s. 4d. for the rupee was established as the gold price of silver, provision being made that when the rupee rose to this value the mints should be reopened to the coinage of silver. The value of the rupee gradually rose, and, so far as the government was concerned, the financial conditions greatly improved. But complaint was made that the native growers and the European planters in India were suffering severely from the change. It was argued that these classes were obliged to pay labor on the old scale, in spite of the appreciation of the currency. Hence, while industrial expenses remained nominally the same, the employers received lower profits. Heavy losses fell also upon the natives, who as times grew hard were obliged to turn their hoards of silver into money. Finally, in the spring of 1898, a currency committee was appointed to investigate the monetary situation in India. This committee reported, in July, 1899, in favor of maintaining the gold standard and making it more effective; and to this end a law was passed in September of the same year. Since 1899 the value of the silver rupee has been stable at the rate fixed—1s. 4d. (32.4 cents). The coinage of rupees, which for some years after 1893 almost ceased, became large in 1900–01, and the profit on the coinage was set aside as a special gold reserve fund to be used in maintaining the rate of exchange between Great Britain and India. There is a comparatively small amount of paper money in circulation in India. It is legal tender within certain limited districts. The amount outstanding in March, 1912, was 613,625,095 rupees, about two-thirds of which was in the districts of Calcutta and Bombay.

According to the Indian money system, 100,000 rupees equal 1 lakh, and 100 lakhs equal 1 crore. Hence a sum that would be read in terms of rupees only, according to the English method, would, according to the Indian method, be differently punctuated and read in terms of both the larger and the smaller denominations. To illustrate: the sum 37884517000 rupees would in English read 37,884,517,000 rupees, but in the Indian notation it would be written 3,788,45,17,000 and read "Three thousand seven hundred eighty-eight crores, forty-five lakhs, seventeen thousand rupees." In Indian money estimates sums are often given in tens of rupees, the abbreviation being rx.

Civil Service. The administrative offices are largely filled through civil-service appointments. Candidates taking the examination required to secure a position must be under 24 years of age. The successful candidate is then on probation for a year in England, during which period certain requirements are to be fulfilled, as, e.g., the learning of the Indian law.

Defense. The supremacy of the British sea power practically guarantees India from invasion by way of the sea, and the Himalaya Mountains perform a like service for a great part of the north frontier. The main interest in the defense of India centres about the northwest frontier, which is the historic gateway for invasions into India. In the last two decades of the nineteenth century the British adopted a more active frontier policy. They have established outposts and fortifications commanding the mountain passes that communicate with the west and north and more securely defend the Trans-Indus region. The British have a post of observation at Chitral and possess an "influence" at Gilgit which enables them to keep informed as to the Hindu Kush passes. Farther south the Swat valley is in the hands of the British. The important Khyber Pass (q.v.) is open, and the large garrison stationed at Peshawar serves to protect it. Continuing south, the Kuram and the Tochi valleys are controlled by the British, as are also the Gunal Pass and the Zhob valley. Quetta has been made a strong defensive point, as has also Sakkar—the city on the Indus where the railroad crosses to the westward. A number of posts along the earlier frontier line farther east are still maintained; others have been abandoned. The scheme of defense has led to the construction of railroads for military purposes, one of which extends to New Chaman, the farthest outpost on the Afghan frontier. These lines now make it possible quickly and easily to transport the soldiers to the different frontier strongholds.

The threatening approach of the Russians to the Indian frontier has established an excuse for the British to maintain a large army. The experience of the Sepoy rebellion has led them to increase the proportion which the British troops hold to the total military force, the intention being that the latter shall constitute one-third of the total number, and that the artillery shall be almost wholly British. The native soldiers are drawn largely from a few tribes, such as the Sikhs, Gurkhas, Rajputs, and Jats, who are the warrior races of the country and are much more efficient as soldiers than are the masses of the population. Class distinctions are recognized, and the different units in the army organization are composed of homogeneous elements. Through the improvement of sanitary conditions, and the exercise of greater caution in locating British soldiers, fatalities are of much less frequent occurrence than formerly. The native states still maintain military forces, but the British have succeeded in their effort to have their number reduced and brought more or less under their own control. For a statement concerning the organization and statistics of the army, see UNITED KINGDOM, *Army*.

Weights and Measures. The unit of weight commonly used is the maund, but it varies greatly in amount, being equivalent to 82 2/7 pounds avoirdupois in Bengal, only about 28 pounds in Bombay, and 25 pounds in Madras. The tola, a small unit, is equivalent to 180 grains. In Bengal there is a unit of measure called the gaz, equivalent to 36 inches. An Act was passed in 1871 to establish a uniform decimal system of weights and measures, but it has never gone into operation.

Population. India is one of the most densely populated countries, containing between one-fifth and one-sixth of the estimated population of the world. In 1911 the number of inhabitants per square mile was 175, as against 27.14 for the United States. The population is most unevenly distributed, nearly two-fifths being found in the valley of the Ganges. As shown in the table, the density is greatest in the Province of Bengal, 578 per square mile, and in Behar, 561. The density of the population corresponds in a general way to the capacity of the different regions to support life, yet there are noteworthy exceptions, as in Assam and Lower Burma, each of which could easily support a much more numerous population than it now does. In most districts the population presses closely upon the limits of the means of subsistence, and cannot increase greatly so long as agriculture continues to be almost the sole dependence. There has been generally an increase, and in many places a very marked increase, of population since the British took possession. Prior to that time numerous wars, together with famine, plague, and pestilence, tended to check augmentation. The instability of the government discouraged industrial enterprise, and much land possible to cultivate was left waste. Under British protection such land has been largely reclaimed, and the productive capacity of the country greatly increased.

The first attempt of the British to secure a complete census was made in 1872, when the total population was estimated to be 240,931,000. The returns for certain regions were only estimated, and were generally rendered uncertain through the lack of confidence on the part of the natives in the purpose of the government. In subsequent enumerations there have been greater confidence on the part of the people and a corresponding increase in the accuracy of the returns. The total population for 1901 was 294,361,056, and that for 1911, 315,156,396. It should be remembered that certain additions of territory have augmented slightly this increase. The gain during the decade 1891–1901 was 4.7 per cent in the provinces, while the states showed a decrease of 5 per cent. The gain in the provinces of the last decade was 5.5 per cent; the population of the native states increased 12.9 per cent, including the new territory. Decreases were shown chiefly in the Punjab. The contrast shown above between one period and the other and between one region and another is largely attributable to the variable agricultural conditions.

The following is a table of the area and population of India and its dependencies:

	Area in square miles	1911	1901
Provinces (total)......	1,093,074	244,267,542	231,605,940
Ajmer-Merwara......	2,711	501,395	476,912
Andamans and Nicobars..........	3,143	26,459	24,649
Assam..........	53,015	6,713,635	5,841,878
Baluchistan..........	54,228	414,412	382,106
Bengal..........	78,699	45,483,077	42,141,477
Behar and Orissa.....	83,181	34,490,084	33,242,783
Bombay..........	123,059	19,672,642	18,559,650
Burma..........	230,839	12,115,217	10,490,624
Central Provinces and Berar..........	99,823	13,916,308	11,971,452
Coorg..........	1,582	174,976	180,607
Delhi *..........	557	391,828	....
Madras..........	142,330	41,405,404	38,229,654
Northwest Frontier Province..........	13,418	2,196,933	2,041,534
Punjab (including Delhi)..........	99,779	19,974,956	20,330,337
United Provinces of Agra and Oudh...	107,267	47,182,044	47,692,277
Native States and Agencies † (total)..........	709,583	70,888,854	62,755,116
Assam State..........	8,456	346,222	284,465
Baluchistan States....	80,410	420,291	428,640
Baroda State..........	8,182	2,032,798	1,952,692
Bengal States..........	5,393	822,565	740,290
Behar and Orissa States	28,648	3,945,209	3,314,474
Bombay States..........	63,864	7,411,675	6,908,559
Central India Agency.	77,367	9,356,980	8,497,805
Central Provinces States..........	31,174	2,117,002	1,631,140
Hyderabad State.....	82,698	13,374,676	11,141,142
Kashmir State..........	84,432	3,158,126	2,905,578
Madras States..........	10,549	4,811,841	4,188,086
Mysore State..........	29,475	5,806,193	5,539,399
Northwest Frontier Agencies..........	25,500	1,622,094	83,962
Punjab States..........	36,551	4,212,794	4,424,398
Rajputana Agency...	128,987	10,530,432	9,853,366
Sikkim State..........	2,818	87,920	59,014
United Provinces States..........	5,079	832,036	802,097
Grand total.....	1,802,657	315,156,396	294,361,056

* Constituted as a separate province Oct. 1, 1912, formerly part of the Punjab.

† See article INDIA, NATIVE STATES OF.

Aden, on the Arabian coast, with an Arabian protectorate embracing 15,500 square miles, and Socotra, a dependency of Aden, are officially included within the Empire of India.

A striking characteristic of the population is that it is so largely rural. Estimates show that about nine-tenths of the total belong to this class. This is true of even the most densely populated regions. The largest city in the most densely populated division of Bengal (Patna) has but 136,000 inhabitants. It must be understood, however, that the rural population is everywhere gathered in villages which may contain only a few families or may number thousands. The country had not many large cities until the period of commercial development brought about by the British. Commerce has occasioned an immense growth in Calcutta and Bombay, but except these cities Madras and Hyderabad alone exceed half a million each. (See table below.) Another peculiarity is the large proportion of males compared with European countries. The great privacy to which the females are subjected, particularly among the Mohammedans, and the aversion to intrusion on their domestic privacy, may serve partly to account for this discrepancy. Statistics for famine districts show that in these regions there is a greater decrease in the male population than the female. It is generally accepted that women withstand the privations of famine better than men.

POPULATION OF THE LARGEST CITIES (INCLUDING IN MOST CASES CANTONMENTS)

CITIES	Total population in	
	1901	1911
Calcutta and suburbs............	1,106,738	1,222,313
Bombay City............	776,006	979,445
Madras............	509,346	518,660
Hyderabad............	448,466	500,623
Rangoon............	234,881	293,316
Lucknow............	264,049	259,798
Delhi............	208,575	232,837
Lahore............	202,964	228,687
Ahmedabad............	185,889	216,777
Benares............	209,331	203,804
Bangalore............	159,046	189,485
Agra............	188,022	185,449
Cawnpore............	197,170	178,557
Allahabad............	172,032	171,697
Poona............	153,320	158,856
Amritsar............	162,548	152,756
Karachi............	116,663	151,903
Mandalay............	183,816	138,299
Jaipur............	160,167	137,098
Patna............	134,785	136,153

Education. Education on the part of England in India has been carried on in the face of many serious obstacles and under complex conditions peculiar to the country. Social, religious, and racial distinctions, solidified in the system of caste, were so thoroughly interwoven with the whole of the life that they circumscribed the scope and modified the methods of English instruction. British education has never had to deal in India with the implanting of Western culture on an Oriental people having no culture of their own, but with the superimposing of one system of culture upon another more philosophically profound in its sphere, and upon a people who cherished an educational lore that antedated by far the one offered them in its stead. A system of education such as it was and restricted to the sanctioned castes—chiefly the Brahman—had never been wanting in India. When the English began to introduce the new system, a bitter dispute arose as to how much recognition should be given this ancient and native learning, e.g., whether the English classics should supplant the Sanskrit and Arabic, and whether the English or the vernacular should be used as a medium of instruction. These questions were finally decided in favor of European as against Oriental knowledge, and in favor of the vernacular as a medium, though English became prominent in advanced instruction, and generous provisions were made to bring it within reach of all who desired it.

This system, which was finally adopted and which in the main continues to-day, was outlined by Lord Halifax in 1854. An investigating commission, reporting in 1883, approved the system, but favored emphasizing certain features, such as the encouragement of native schools and of primary and female education, to the end that the masses might share more liberally in the benefits of learning. Religious instruction has never been permitted in the state schools—a policy different from that pursued by the English government in the schools of England, and which has generally been opposed by the clerical and missionary interests. At the same time the state advances financial aid to missionary schools without discrimination as to sect and endeavors to avoid competition with them by not establishing schools where the missionary schools already provide adequate facilities. Both missionary and state schools are under the supervision of state inspectors and must conform to certain regulations. Grants in aid consist of salary grants, results' grants, building grants, etc. The state educational system is complete in scope, including primary, secondary, and collegiate instruction, and is systematically organized and administered. Normal schools are maintained in every province. There are five universities—Calcutta, Madras, Bombay, the Punjab, and Allahabad. They consist of examining bodies only, but have a large number of affiliated colleges. The number of persons receiving instruction has greatly increased during the past half century. The field of education is, however, limited. The attendance is largely from the middle classes, especially in the state schools, and while the missionaries reach a larger proportion from the lower castes, the entire number is small in comparison with the number of persons to whom opportunities for education never come.

Two criticisms in particular have been urged against the present system. The first is the relative overemphasis of higher education. This emphasis has been in accordance with the "filtering down theory," under which it was thought that the masses could be reached best through the agency of a highly educated native class. This theory in practice, however, leaves the masses untouched. The other criticism is that too much attention is given to classical and not enough to industrial instruction, and that accordingly the pupils are not fitted to take an active part in the industrial transformation which the country needs.

In 1911-12 there were 2,245,468 pupils in public institutions under public management, 3,892,775 pupils in public institutions under private management (aided and unaided), and 657,728 in private institutions. Of these 4116 were in British Baluchistan. Of the total 6,791,855 in India proper, only 953,989 were females. The average daily attendance represents about 77 per cent of the total number of pupils, but the relation of the average attendance to the total enrollment differs greatly in the different provinces. The grand total of all pupils in public and private institutions increased from 3,692,000 in 1890 to 6,795,971 in 1912. Native Christian pupils numbered 197,481, Hindu 4,406,983, Mohammedan 1,562,007, Europeans and Eurasians, 34,958, and others (mainly Buddhists), 600,254 (data for March 31, 1912). In public institutions there were over 95 per cent of the pupils studying the vernacular language; the percentage of those studying the classical languages and the English language was small. Nearly 28 per cent of the proceeds used for education was derived from fees, the remainder being divided between provincial, local, and municipal funds and other sources. The total expenditure on public instruction increased gradually from £2,210,563 in 1894-95 to £5,250,922 in 1911-12.

Important changes of educational policy in 1913, apart from increased grants to elementary schools, were foreshadowed with respect to the universities. It was officially promised that a university at Dacca, with 11 constituent, residential, and teaching colleges, is to be organized as a type intended to supersede the existing universities, which consist of affiliated, nonresident examining colleges. This change would be an approximation to the lines on which Oxford and Cambridge universities are organized. Progress was also made in the work of giving native educational institutions of importance, such as the Mohammedan College at Aligarh, a university standing, and the establishing of universities also at Benares, Rangoon, Patna, and other places was discussed. In these attempts any design of interfering with religious prejudices has been entirely excluded.

RELIGION

From the earliest times India has been a land of numerous religions, and the creeds professed there to-day are almost as great in number as they are varied in spirit and character. The majority of the people acknowledge Hinduism or Brahmanism (q.v.) as their faith. In the census of 1911 their number is given as over 217,000,000. Next in proportion, claiming about a third of this number, is Mohammedanism, which was introduced into India in the eleventh century and spread with great rapidity. Its adherents claim no less than 66,000,000 souls throughout India, their numbers being largest in the north. Together these religions make up the faith of approximately 90 per cent of the entire population. The number of Buddhists is given at over 10,000,000; they are nearly all inhabitants of Burma. Statistics show that the number of nature worshipers, who are roughly classed under the head of animistic, is over 10,000,000, while the Sikh religion is professed by over 3,000,000 individuals. Besides these there is a large representation of Jains (over 1,000,000) and a scattering number of Parsis (about 100,000). The spread of Christianity among the natives has been extensive, for the number is considerably above 3,000,000 souls. There are nearly 21,000 Jews. Separate articles will be found devoted to the most important branches of Indian religions. (See BRAHMANISM; BUDDHISM; HINDUISM; JAINISM; MOHAMMEDANISM; PARSIS; SIKHS.) The results of the religious survey of India in the census of 1911 present the statistics on page 74. The first table is itemized by provinces for British India, with totals for native states and agencies. The second is for the summary of the Christian population.

For convenience of treatment, the religious development of India may be divided into the following periods: first, the Vedic era, or earliest religious beliefs of the Aryan Hindus; second, Brahmanism proper, or the faith incul-

ADMINISTRATIONS, PROVINCES	Hindus	Sikhs	Jains	Buddhists	Parsis	Mohammedans	Christians	Animists	Total *
Ajmer-Merwara	389,436	922	20,302	....	262	81,035	5,432	3,979	501,395
Andamans and Nicobars..............	9,527	455	....	1,597	.....	4,580	566	9,711	26,459
Assam..............	3,637,828	750	2,398	10,506	5	1,886,528	66,430	1,109,187	6,713,635
Baluchistan:.........	26,511	5,290	10	14	166	377,333	5,030	....	414,412
Bengal Presidency....	20,380,700	2,217	6,206	240,854	610	23,989,719	129,518	730,182	45,483,077
Behar and Orissa.....	28,365,235	2,177	4,440	496	35	3,666,861	229,825	2,220,526	34,490,084
Bombay (incl. Sind and Aden)............	14,922,965	11,887	212,309	691	80,980	4,024,485	233,246	170,355	19,672,642
Burma..............	389,679	6,693	495	10,384,579	300	420,777	210,081	701,473	12,115,217
Central Provinces and Berar............	11,497,460	2,201	70,258	9	1,728	564,909	34,697	1,744,921	13,916,308
Coorg...............	138,922	....	97	....	34	13,143	3,553	19,227	174,976
Madras..............	36,806,978	7	26,995	693	488	2,740,408	1,191,259	638,463	41,405,404
Northwest Frontier Province†..........	119,942	30,345	4	....	49	2,039,994	6,585	....	2,196,933
Punjab..............	6,682,818	2,093,804	39,637	4,190	626	10,955,721	198,106	....	19,974,956
United Provinces of Agra and Oudh.....	40,253,433	15,160	75,427	780	872	6,658,373	177,949	....	47,182,044
Total, Provinces	163,621,434	2,171,908	458,578	10,644,409	86,155	57,423,866	2,492,277	7,348,024	244,267,542
Total, Native States..	53,965,466	842,558	789,604	77,040	13,945	9,199,546	1,383,919	2,947,144	69,256,439
Grand total, all India.	217,586,900	3,014,466	1,248,182	10,721,449	100,100	66,623,412	3,876,196	10,295,168	313,523,981*

* Jews, numbering 20,980, and minor sects, numbering 37,128, are included in this column.
† The religion of 1,608,556 people in the Northwest Frontier Province was not recorded.

CHRISTIANS ACCORDING TO RACE AND DENOMINATION FOR ALL INDIA

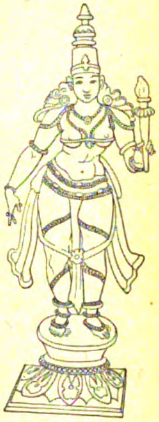
DENOMINATIONS	Europeans	Anglo-Indian (Eurasians)	Natives	Total
Anglican...........	125,392	34,553	332,372	492,317
Arminian..........	1,135	30	33	1,198
Baptist............	2,817	2,239	331,540	336,596
Congregationalist...	735	289	134,240	135,264
Greek.............	522	17	1,130	1,669
Lutheran..........	1,469	188	216,842	218,499
Methodist..........	6,904	2,573	162,277	171,754
Presbyterian.......	15,149	1,911	164,068	181,128
Quaker............	45	6	1,194	1,245
Roman Catholic....	40,120	57,024	1,393,720	1,490,864
Romo-Syrian.......	2	6	413,134	413,142
Syrian............	5	....	315,157	315,162
Salvationist........	189	19	52,199	52,407
Total..............	194,484	98,855	3,517,906	3,811,245
Grand total, including other denominations and those not returned	....	....	....	3,876,196

cated by the priests in the religious books called Brahmanas, and in the philosophical Upanishads (q.v.); third, the period of the two great religious reforms, Buddhism and Jainism (q.v.), both of which were a reaction against decadent Brahmanism; fourth, the newer Hinduism or Brahmanic counterreform, a wider and more catholic faith which sprang out of the schismatic reform movement; and, finally, the later Hindu sectarian outgrowths and the tendencies of the popular faiths. The *Rig-Veda* and *Atharva-Veda* represent the literature of the earliest period; the *Yajur-Veda* is nearer to the second religious phase, or the Brahmanism of the priests; the sacred books of the Buddhistic and Jainistic reformations are written respectively in Pali (q.v.). and Prakrit (q.v.); again, the great Sanskrit epic poems of the *Mahâbhârata* and the *Râmâyana* represent both the purer Brahmanic stage and the later sectarian tendencies; for the latter our chief source of information is that class of mythological works known under the name of *Puranas* (see PURANA) and *Tantras* (see TANTRA); their commentaries and sectarian literature; the material for the developments after 1500 B.C. must be gathered from various sources. With reference to the time of these eras we can only say in a general way that the Vedic period runs from a very early period down to about 1000 B.C. or a couple of centuries afterward, and merges into the Brahmanic age, which closes perhaps about 500 B.C. The age of Buddhism was from about 500 B.C. to 500 A.D., and the period of epic Hinduism, according to Hopkins, covers about the same centuries. From 500 to 1500 A.D. is the era of Brahmanic counterreforms and of sectarianism, while since that time unifying tendencies have been more operative than ever before. It is necessary at the outset, however, to guard the reader against attempting to connect dates with the earlier of these periods. It has not been uncommon for writers on this subject to assign thousands of years before the Christian era as the starting points of various phases of Hindu antiquity; others, more cautious, marked the beginnings of certain divisions of Vedic works with 1200, 1000, 800, and 600 years B.C. The truth is that, since Hindu literature itself is almost without known dates, owing either to the peculiar organization of the Hindu mind or to the convulsions of Indian history, the present condition of Sanskrit philology does not afford the scholar the requisite resources for embarking with any chance of success in such chronological speculations. The question of Hindu chronology will be more particularly considered in the article VEDA. In the meantime the utmost stretch of assumption which in the present condition of Sanskrit philology it is permitted to make is that the latest writings of the Vedic class are not more recent than the second century before Christ. A like uncertainty hangs over the period at which the two great epic poems of India were composed, although there is reason to surmise that the lower limits of that period did not reach beyond the beginning of the Christian era. The Puranic period, on the other hand, scholars are gen-

HINDU DEITIES

Krishna.

Indra.


Lakshmī.

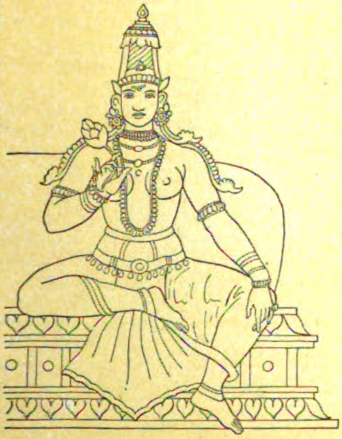
Ganēśa.

Agni.

Hanumān.

Brahmā.

Brahmā.
ARCHAIC FORM


Pārvatī.

Vishnu

Śiva.

erally agreed to regard as corresponding with part of our mediæval history, or roughly from 500 to 1500 A.D., although the material in these writings is often much older in its content.

Vedic Religion. If the Rig-Veda—the oldest of the Vedas, and one of the oldest literary documents in existence—coincided with the beginning of Hindu civilization, the popular creed of the Hindus, as depicted in some of its hymns, would reveal not only the original creed of this nation, but throw a strong light on the original religion of humanity itself. Unhappily, however, the imagination, indulging in such an hypothesis, would have little foundation to work on. There are, of course, numerous traces in the Rig-Veda of survivals of earlier animistic beliefs, of spiritism, fetishism, and ancestor worship; but the Hindus, as depicted in these hymns, are far removed from the starting point of human society; they may, in fact, fairly claim to be ranked among those already civilized communities experienced in arts, defending their homes and property in organized warfare, acquainted even with many vices which are found only in an advanced condition of artificial life. Yet, in examining the ideas expressed in the greatest number of the Rig-Vedic hymns, it cannot be denied that they are neither ideas engendered by an imagination artificially influenced nor such as have made a compromise with philosophy. The Hindu of these hymns is essentially engrossed by the might of the elements. The powers which turn his awe into pious subjection and veneration are: *Agni* (q.v.), the fire of the sun and lightning; *Indra* (q.v.), the god of the storm and the thunder; the *Maruts* (q.v.), or winds; *Surya* (q.v.), the sun; *Ushas* (q.v.), the dawn, whose hymns are among the most beautiful; and various kindred manifestations of the luminous bodies, and nature in general. He invokes them, not as representatives of a superior being, before whom the human soul professes its humility, nor as superior beings themselves, which may reveal to his searching mind the mysteries of creation or eternity, but because he wants their assistance against enemies—because he wishes to obtain from them rain, food, cattle, health, and other boons. He complains to them of his troubles, and reminds them of the wonderful deeds they performed of yore, to coax them, as it were, into acquiescence and friendly help; in fact, he seeks them more for his material than for his spiritual welfare. What we should call the ethical side is less pronounced. Sin and evil, indeed, are often adverted to, and the gods are praised because they destroy sinners and evildoers; but one would err in associating with these words our notions of sin or wrong. A sinner, in these hymns, is rather a man who does not address praises to those elementary deities, or who does not gratify them with the oblations they receive at the hands of the believer. He is the foe, the robber, the demon—in short, the borderer infesting the territory of the "pious" man. The latter, in his turn, may injure and kill, but, in adoring Agni, Indra, and their kin, he is satisfied that he can commit no evil act. Yet some of the hymns, especially those addressed to the supersensuous, transcendental god *Varuna* (q.v.), the guardian of order and right, seem to imply the strongest sense of moral obligation and of sin as we understand the word. On the whole, it may also be said that the internal condition of the Hindu community, the features of which may be gathered from the hymns, seems to bespeak union and brotherhood among its members; and the absence, in general, of hymns which appeal to the gods for the suppression of internal dissensions or public vices, bears testimony apparently to the good moral condition of the people whose wants are recorded in these songs.

It may be imagined that the worship of elementary beings like those we have mentioned was originally a simple and harmless one. It is true that the sacrifice of sheep and goats, bulls, and even horses, was known, but it was not general. By far the greatest number of the Rig-Veda hymns know of but one sort of offering made to these gods; it consists of the juice of the soma (q.v.), or moon plant, which, pressed out and fermented, was an exhilarating and inebriating beverage, and for this reason, probably, was deemed to invigorate the gods and to increase their beneficial potency. It was presented to them in ladles or sprinkled on the sacred Kusa grass. Clarified butter, too, poured on the fire, is mentioned in several hymns as an oblation agreeable to the gods, and it may have belonged to the primitive stage of the Vedic worship. There were no temples of the divinities and in early times no images. The altar, if used, was very simple. The gods easily gathered from the atmospheric region roundabout.

There is a class of hymns, however, to be found in the Rig-Veda which already depart materially from the simplicity of the conceptions we are referring to. In these the instinctive utterance of feeling makes room for the language of speculation; the allegories of poetry yield to the mysticism of the reflecting mind; and, the mysteries of nature becoming more keenly felt, the circle of beings which overawe the popular mind becomes enlarged. Thus, the objects by which Indra, Agni, and the other deities are propitiated become gods themselves; soma, especially, the moon plant, with its juice, is invoked as the bestower of all worldly boons. The animal sacrifice, the properties of which seem to be more mysterious than the offerings of soma or of clarified butter, is added to the original rites. Mystical allusions and symbolic expressions begin likewise to crop out in the later portions of the Veda, revealing the fact that the Hindu mind was no longer satisfied with the adoration of the elementary or natural powers, and giving evidence that the religion was beginning to deal with the problem of the mysteries of creation. In the tenth and last book of the Rig-Veda, speculations are found with regard to the origin of the universe, the whence and the whither, the who and the what. As soon as the problem implied by hymns like these was raised in the minds of the Hindus, Hinduism must have ceased to be the worship of only elementary powers. Henceforward, therefore, we see it either struggling to reconcile the latter with the idea of one supreme being or to emancipate the inquiry into the principle of creation from the elementary religion recorded in the oldest portion of Vedic poetry.

Brahmanism Proper. The development from the older into the newer, from the elemental and natural into the artificial, ritualistic, and philosophic, or from the early Rig-Veda stage of religion into Brahmanism, may be traced through the *Yajur-Veda*, or book of knowledge of the sacrifice and the ritual. The priestly power of the Brahmans is supreme in this sacred book, and in the Yajur-Veda may be seen the beginnings of Brahmanism, as shown in its fuller development in the branch *Brahmanas* (see VEDA) and in the philosophical writings termed *Upanishad.* (See UPANISHAD.) In the Brahmanas—a word of the neuter gender, and not to be confounded with the similar word in the masculine gender, denoting the first Hindu caste—the mystical allegories which now and then appear in what we have called the second class of Vedic hymns, are not only developed to a considerable extent, but gradually brought into a systematic form. Epithets given by the Rig-Veda poets to the elementary gods are made the bases of legends, assuming the shape of historical narratives. The simple and primitive worship mentioned in the hymns becomes highly complex and artificial. A ponderous ritual, founded on those legends and supported by a far more advanced condition of society, is brought into a regular system, which requires a special class of priests to keep it in a proper working order. Some of the Vedic hymns seem to belong already to the beginning of this period of the Brahmana worship, for in the second book of the Rig-Veda several such priests are enumerated in reference to the adoration of Agni, the god of fire; but the full contingent of 16 priests, such as is required for the celebration of a great sacrifice, does not make its appearance before the composition of the Brahmanas and later Vedas. Yet, however wild many of these legends are, however distant they become from the earlier veneration of the elementary powers of nature, and however much this ritual betrays the gradual development of the institution of castes—unknown to the hymns of the Rig-Veda—there are still two features in them which mark a progress of the religious mind of ancient India. While the poets of the Rig-Veda are chiefly concerned in glorifying the visible manifestations of the elementary gods, in the Brahmanas their ethical qualities are put forward for imitation and praise. Truth and untruth, right and wrong—in the moral sense which these words imply—are not seldom emphasized in the description of the battles fought between gods and demons; and several rites themselves are described as symbolical representations of these and similar qualities of the good and evil beings, worshiped or abhorred. A second feature is the tendency, in these Brahmanas, to determine the rank of the gods, and, as a consequence, to give prominence to one special god among the rest; whereas in the old Vedic poetry, though we may discover a predilection of the poets to bestow more praise, e.g., on Indra and Agni than on other gods, yet we find no intention on their part to raise any of them to a supreme rank. Thus, in some Brahmanas, Indra, the god of the firmament, is endowed with the dignity of a ruler of the gods; in others, the sun receives the attributes of superiority. This is no real solution of the momentous problem hinted at in the Vedic hymns, but it is a semblance of it. There the poet asks "whence this varied world arose"; here the priest answers that "one god is more elevated than the rest," and he is satisfied with regulating the detail of the soma and animal sacrifice according to the rank which he assigns to his deities. See BRAHMANISM.

A real answer to this great question is attempted, however, by the theologians who explained the "mysterious doctrine," held in the utmost reverence by all Hindus, and laid down in the Upanishad (q.v.). It must suffice here to state that the object of these important works is to explain not only the process of creation, but the nature of a supreme being and its relation to the human soul. In the Upanishads, Agni, Indra, Vayu, and the other deities of the Vedic hymns become symbols to assist the mind in its attempt to understand the true nature of the one absolute being, and the manner in which this being manifests itself in its worldly form. The human soul itself is of the same nature as this supreme or great soul; its ultimate destination is reunion with the supreme soul, and the means of attaining that end is not the performance of sacrificial rites, but the comprehension of its own self and of the great soul. The doctrine which at a later period became the foundation of the creed of the educated—the doctrine that the supreme soul, or (the neuter) Brahman, is the only reality, and that the world has a claim to be noticed only in so far as it emanated from this being, is already clearly laid down in these Upanishads, though the language in which it is expressed still adapts itself to the legendary and allegorical style which characterizes the Brahmana portion of the Vedas. The Upanishads became thus the basis of the enlightened faith of India. They are not a system of philosophy, but they contain all the germs whence the three great systems of Hindu philosophy arose; and like the latter, while revealing the struggle of the Hindu mind to comprehend the one supreme being, they advance sufficiently far to express their belief in such a being, but at the same time acknowledge the inability of the human mind to understand its essence.

From the Brahmanic religion with its theology, its sacrifice, its stifling ritual, and widespread priestcraft, there was bound later to come a revolt. Premonitory symptoms of this are plainly to be seen in the Upanishads, which prepared the way for emancipation. The reform wave swept over India in the two great reactionary movements of Buddhism and Jainism. The character and extent of these reformatory movements are spoken of under special articles and need not be discussed here. The eastern part of India was the source from which they sprang, but Jainism gradually spread westward especially, and Buddhism expanded itself over other parts of India to Ceylon and far beyond the borders of Hindustan.

Hinduism. In spite of the reform movements the old Brahmanism was not destined to disappear. But it was forced to undergo changes which were largely due to the influence of the protesting faiths of Buddhism and Jainism. During the very time while they were flourishing it quietly but firmly held its own, was consciously or unconsciously being remodeled and adjusted to altered conditions and environments, and was gradually but surely changing into the newer Hinduism, with all that restoration meant. It is this changing Brahmanism and earlier Hinduism in its sectarian developments that is presented to us in the great Hindu epics.

The epic period of Hinduism is marked by a similar development of the same two creeds, the general features of which we have traced in the Vedic writings. The popular creed strives to find a centre round which to group its imaginary gods, whereas the philosophical creed finds its expression in the groundworks of the Sankhya, Nyaya, and Vedanta systems of philosophy. In the former we find two gods in particular who are rising to the highest rank, Vishnu and Siva, the Vedic Rudra; for *Brahmā* (the masculine form of Brahman), though he was looked upon now and then as superior to both, gradually disappears and becomes merged into the philosophical *Bráhmă* (the neuter form of the same word), which is a further evolution of the great soul of the Upanishads. In the *Rāmāyaṇa* the superiority of Vishnu is admitted without dispute; in the great epos, the *Mahābhārata*, however, which, unlike the former epos, is the product of successive ages, there is an apparent rivalry between the claims of Vishnu and Siva to occupy the highest rank in the pantheon. It is one of the difficult problems of Sanskrit philology to unravel the chronological position of the various portions of this work, to lay bare its groundwork, and to show the gradual additions it received, which must be done before it will be possible to determine the successive formation of the legends which are the basis of classical Hindu mythology. A great deal has been done, however, and this much seems to be clear even already, that there was a predilection during this epic period for the supremacy of Vishnu, one of whose incarnations was the much-beloved Krishna (q.v.), and that the policy of incorporating rather than combating antagonistic creeds led more to a quiet admission than to a warm support of Siva's claims to the highest rank.

The philosophical creed of this period adds little to the fundamental notions contained in the Upanishads, but it frees itself from the legendary dross which still imparts to those works a deep tinge of mysticism. On the other hand, it conceives and develops the notion that the union of the individual soul with the supreme spirit may be aided by penances, such as peculiar modes of breathing, particular postures, protracted fasting, and the like; in short, by those practices which are systematized by the Yoga doctrine. The most remarkable epic work which inculcates this doctrine is the celebrated poem *Bhagavadgītā*, which has been wrongly considered by European writers as a pure Sankhya work, whereas Sankara, the great Hindu theologian who commented on it, and other native commentators after him, have proved that it is founded on the Yoga belief. The doctrine of the reunion of the individual soul with the supreme soul was necessarily founded on the assumption that the former must become free from all guilt affecting its purity before it can be remerged into the source whence it proceeded; and since one human life is apparently too short for enabling the soul to attain its accomplishment, the Hindu mind concluded that the soul, after the death of its temporary owner, had to be born again, in order to complete the work it had left undone in its previous existence, and that it must submit to the same fate until its task is fulfilled. This is the doctrine of metempsychosis (*saṃskāra*), which is a logical consequence of a system which holds the human soul to be of the same nature as that of an absolute God. The beginning of this doctrine may be discovered in some of the oldest Upanishads, but its development belongs to the epic time, where it pervades the legends and affects the social life of the nation. See METEMPSYCHOSIS.

Puranic Hinduism. The Puranic period, with its various cults, comprises the development of the newer Hinduism from about the sixth century of our era to the sixteenth century. The *Puranas* (see PURANA) and the *Tantras* (see TANTRA) represent this phase of the religion which succeeded epic Hinduism and supplanted Buddhism. The old Brahmanic vigor was not dead, but was ready to revive. In the eighth century Kumarila strengthened it on the ritualistic side, and the great Vedantist Sankara in the ninth century added to its power on the philosophic side. But the Puranic period of Hinduism was a period of decline, so far as the popular creed is concerned. Its pantheon is nominally the same as that of the epic period. Brahma, Vishnu, and Siva remain still at the head of its imaginary gods; but whereas the epic time is generally characterized by a friendly harmony between the higher occupants of the divine spheres, the Puranic period shows discord and destruction of the original ideas whence the epic gods arose. Brahma withdraws, in general, from the popular adoration, and leaves Vishnu and Siva to contest in the minds of their worshipers for the highest rank. The elementary principle which originally inhered in these deities is thus completely lost sight of by the followers of the Puranas. The legends of the epic poems relating to these gods become amplified and distorted according to the sectarian tendencies of the masses; and the divine element which still distinguishes these gods in the *Rāmāyaṇa* and *Mahābhārata* is now more and more mixed up with worldly concerns and intersected with historical events, distorted in their turn to suit individual interests. Of the ideas implied by the Vedic rites, scarcely a trace is visible in the Puranas and Tantras, which are the textbooks of this creed. In short, the unbridled imagination which pervades these works is neither pleasing from a poetical nor elevating from a philosophical point of view. Some Puranas, it is true—e.g., the *Bhāgavata*—make in some sense an exception to this aberration of original Hinduism; but they are a compromise between the popular and the Vedantic creed, which henceforward remains the creed of the educated and intelligent. They do not affect the worship of the masses as practiced by the various sects; and this worship itself, whether harmless, as with the worshipers of Vishnu, or offensive, as with the adorers of Siva and his wife Durga, is but an empty ceremonial, which here and there may remind one of the symbolical worship of the Vedic Hindu, but, as a whole, has no connection whatever with the Vedic Scriptures, on which it pretends to rest. It is this creed which with further deteriorations, caused by the lapse of centuries, is still the main religion of the masses in India. One of these causes of deterioration is the Yoga (q.v.), or belief in a supernatural state which individuals may enter by going through certain practices. Its most authoritative literary exposition is the *Yōga-sūtra* of Patanjali (q.v.).

The philosophical creed of this period, and the creed which is still preserved by the educated classes, is that derived from the tenets of the Vedanta philosophy. It is based on the belief in one supreme being, which imagination and speculation endeavor to invest with all the perfections conceivable by the human mind, but the true nature of which is, nevertheless, declared to be beyond the reach of thought, and which on this ground is defined as not possessing any of the qualities by which the human mind is able to comprehend intellectual or material entity. See VEDANTA.

Hindu Sects and Modern Popular Faith. Under this designation may be comprised the sects which arose during the last period of Hinduism and the beliefs which are common to the Hindus to-day. These believers suppose that their religion is countenanced by the Vedas, but its source in reality is to be found in the Puranas and Tantras. They have in common a general sort of recognition of the Hindu trinity or triad—Brahma the creator, Vishnu the preserver, and Siva the destroyer—but in practice they are either Vishnuites or Sivites; for Brahma is little more than an abstraction and plays a very subordinate part to-day contrasted with his rivals. Sivaism may loosely be said to be more popular in the northeast and south of India; Vishnuism rather in the northwest, but also in the south. The wives or female energies of these two gods also receive adoration. (See VAISHNAVAS; SAIVAS; SAKTAS.) Common to them all are certain acts of worship, reverence for the cow, the offering of votive gifts, adoration in the temples, and the performance of special ceremonies, such as the fulfillment of vows by going on religious pilgrimages for the purpose of acquiring merit. The caste system also has a strongly religious bearing, although it tends to break down through association with Occidentals. (See CASTE.) Besides the great sects there are likewise some of limited extent and total insignificance, such as the worshipers of Agni, the god of fire; of Surya, the sun god; of Ganesa, the god of wisdom and remover of obstacles. Some of these latter sects were looked upon as partly unorthodox, partly heterodox, as early as the ninth and fourteenth centuries of our era. Regarding the sect of the Sikhs, which arose in the fifteenth century, reference may be made to the special article on that topic. Reform movements in India have been familiar since the early days of Buddhism and Jainism, down through Sikhism to the modern times. In the nineteenth century a special religious agitation was set on foot by Rammohun Roy (1774–1833) (q.v.), which resulted in the establishment of the Brahmo-Somaj (q.v.), a sort of national church of the Hindus. The movement has extended widely throughout India, and, like the Arya-Somaj, it is eclectic in its tendencies, seeking to combine the teachings of the Veda with the tenets of the Bible and the sacred books of other faiths. There are also in India some 20,000 believers in the Jewish religion, and allusion has been made above to the presence of some 100,000 Parsis, who made their home in India more than 1000 years ago. These topics are treated under separate headings. See also HINDUISM.

Christianity in India. With reference to the spread of Christianity in Hindustan, as mentioned above, it may be stated that India was one of the earliest fields of Christian missions. Tradition assigns it as the scene of the Apostle Thomas's labors and martyrdom. Whether this was the case or not, we find a Syrian church planted in Malabar in south India, which undoubtedly had a very early origin. The colonization of Goa by the Portuguese was followed by Franciscan and Dominican propaganda. The Jesuit missionaries, from the middle of the sixteenth century onward, had a large success in India. (See FRANCIS XAVIER.) The appointment by the popes of Vicars Apostolic led to a long conflict with the Portuguese clergy, which only subsided after the Concordat of 1886. The earliest Protestant missionaries in India came from Holland and Denmark. With the latter mission the eminent Schwartz was connected. England's first missionary effort was made by the Society for the Propagation of the Gospel, and the Christian Knowledge Society, which commenced in the beginning of the eighteenth century by aiding the Danish mission already established in south India. Subsequently the East India Company adopted the policy of excluding missionaries altogether from their territories; but since the beginning of the last century, when these restrictions were withdrawn, great activity has been manifested, in which all denominations are represented. In the proclamation to the princes, chiefs, and people of India, read in the principal cities, on Nov. 1, 1858, it was declared "that none shall be in any wise favored, none molested or disquieted, by reason of their religious faith and observances, but that all shall alike enjoy the equal and impartial protection of the law." The fullest toleration in matters of faith is the rule throughout British India. Fanaticism only, as when it sought to enforce the burning of widows or suttee (q.v.) or to offer human beings in sacrifice, is curbed by the ruling power. There is no exclusively endowed state church, but the government continues to pay the state grants made to Hindu temples and to Mohammedan mosques. Clergymen of the Church of England, the Church of Scotland, and the Roman Catholic church, are retained on the government establishment as civil or military chaplains. There are Church of England bishops at Calcutta, Madras, and Bombay. The number of Christians in India in 1913 was given in the census as 3,876,196, of whom 1,490,864 were Roman Catholics. The members of the Church of England numbered 492,317. The rest belonged chiefly to Protestant denominations.

For a study of the entire religious development of the Hindus, consult: Wilkins, *Modern Hinduism* (2d ed., London, 1887); Barth, *Religions of India* (3d ed., ib., 1890); Hopkins, *Religions of India* (Boston, 1895); Hardy, *Indische Religionsgeschichte* (Leipzig, 1898); Monier-Williams, *Hinduism*, in the series of "Non-Christian Religious Systems" (London, 1900); Winternitz, *Geschichte der indischen Litteratur* (Leipzig, 1908–); Moore, *History of Religions*, vol. i (New York, 1913).

Archæological Remains. The antiquities and the archæological remains in India are largely of an architectural character. (See INDIAN ART.) From the prehistoric age there are no monuments surviving beyond possibly some cairns and cromlechs; and the same is true of the Vedic period of Aryan India, because the structures were mostly of wood or of destructible material. Indian archæology begins practically with the age of Buddhism and Jainism. Connected with these faiths there are characteristic shrines, temples, and monuments in various parts of India, dating from 250 B.C. onward. Most famous from the standpoint of archæological research are the great cave at Karli, and also the caves at Ajanta, Ellora, and Lena, constructed with their assembly halls or churches (*chaityas*) and their monastic cells (*vihāras*). Of like interest are the huge mounds or tumuli (*stūpas, tōpes*), like that at Sanchi, near Bhilsa, erected to contain in a shrine (*dāgoba*) some relic of Buddha. The balustrades about these structures are well known because of their artistic value and because of the light they throw on scenes connected with Buddhist life. (See GAUTAMA BUDDHA; JATAKA.) Of particular antiquarian interest, likewise, are the various columns or shafts (*stambhas, lāts*), set up in various parts of India by King Aśoka (q.v.). They show evidence of Persian influence. The inscriptions on these, like his rock-cut edicts, are of special importance. Under a slightly different category, but of similar antiquarian interest, are the famous Gandhara sculptures, representing incidents in Buddha's life. The influence of Græco-Bactrian art is plainly evident in these. Of a much later date, but quite Hindu in character, are the cave temples of Elephanta (q.v.), near Bombay, with their sculptured figures of Brahma, Vishnu, and especially Siva. These may not, however, antedate the ninth century of our era. The remaining groups of antiquarian remains, chiefly architectural, are grouped under the head of Dravidian architecture, the Bengali and Chālukyan style of temple structure, and the artistic building of the era of Mohammedan rule. For details regarding these, consult: Fergusson, *History of Indian and Eastern Architecture* (London, 1876; new ed. rev. by Burgess, 1910); Le Bon, *Les monuments de l'Inde* (Paris, 1893); A. Grünwedel, *Buddhist Art in India* (London, 1901); Fanshawe, *Delhi Past and Present* (ib., 1908); E. B. Havell, *Indian Architecture . . . from the Mohammedan Invasion to the Present Day* (ib., 1913); Vincent Smith, *History of Fine Art in India* (Oxford, 1911). In 1897 arrangements were made in connection with the International Congress of Orientalists to establish an Association for Archæological Research and Exploration in India, and special archæological work under the supervision of the French government has since been carried on in Cambodia, besides the researches conducted by various scholars individually in India itself.

Language. With its hundreds of millions of inhabitants, there is as great a diversity of languages in India as there is variety in the peoples themselves. By far the larger majority, over 220,000,000, speak languages or dialects belonging to the Indo-Germanic group of tongues, and related, though perhaps not by direct descent, to the ancient Vedic dialect. This Indo-Aryan division is therefore first in importance, and three periods or stages may be recognized in its historical development. The earliest of these is sometimes called the Old Indic speech and includes the Vedic dialect, Pali, in the broad sense now given to this term, and the literary or classic Sanskrit. The second period embraces the Middle Indian Prakrits. (See PRAKRIT.) The third, termed New Indian, includes the modern Indian vernaculars, which are in the main descended from popular Prakrit dialects, and are spoken largely in the north, east, and central provinces of India. Under this designation are comprised Punjabi, Kaśmiri, and Sindhi, the speech of over 21,000,000 people, on the north and west; next, the Hindi, spoken by 80,000,000, and called Urdu or Hindustani when admixed with Persian and Arabic; again, Gujarati and Marathi, the chief languages of the Bombay Presidency, and claiming over 27,000,000 speakers; furthermore, Bengali, the vernacular of more than 44,000,000 individuals in the east, together with Uriya and Behari, likewise in eastern India; also Nepali, the language of Nepal, and Assami, still farther to the east. Separate articles regarding the characteristics of these various Indo-Aryan vernaculars will be found under the individual names. Among the non-Aryan languages the most important family is the Dravidian (q.v.), the tongue of some 56,000,000 people inhabiting the peninsular portion of India. The Kolarian or Munda branch numbers about 3,179,000 speakers, while the Tibeto-Burman family has more than thrice as many. The Khasi group (Assam) and the Mon-Annam and Shan families aggregate together over half a million speakers. Gypsy dialects are spoken by some 350,000 people. These figures are those of the 1901 census. In addition to this the division of Iranian languages (q.v.) is represented on the borders of Afghanistan and Baluchistan. The linguistic statistics of India include, moreover, the languages, like English, German, French, etc., which are used by Europeans resident in India, and similarly such other languages as may be used by various Asiatics living at the time in Hindustan. See INDIAN PEOPLES. In addition to the bibliographical references given under the various separate articles, consult: Beames, *Comparative Grammar of the Modern Aryan Languages of India* (London, 1872–79); Cust, *Modern Languages of the East Indies* (ib., 1878); Hoernle, *Comparative Grammar of the Gaudian Languages* (ib., 1880); Constable, *Hand-Atlas of India* (ib., 1893); Baines, "The Language Census of India," in the *Transactions of the Ninth International Congress of Orientalists* (ib., 1893); Grierson, *Linguistic Survey of India* (Calcutta, 1903 et seq.); P. Schmidt, *Grundzüge einer Lautlehre der Mon-Khmer Sprachen* (Vienna, 1906).

HISTORY

The early history of India is wrapped in legend. Only by references in native or in foreign writings and by inscriptions can the story of the ancient period be reconstructed. The Indian mind is essentially an unhistoric one. We have, indeed, many sovereigns mentioned and even whole dynasties given in the Puranas (see PURANA), the epics, and other Sanskrit writings; but of history, in the real sense of the word, there is practically none. The accounts which are given are so interwoven with myth and fancy that they have almost no value to the historian. Indian history falls roughly into three periods: the National or Hindu period (c.2000 B.C. to 1001 A.D.), the Mohammedan period (1001–1757 A.D.), and the period of the establishment of European dominion (1757–).

National or Hindu Period. The Aryans (q.v.) entered the Punjab perhaps as early as 2000 B.C. They came from the Iranian country, apparently by two routes, through the mountain passes in southern Afghanistan and by way of Chitral, and, gradually forcing their way east and south, expelled or subdued the aborigines, such as the Dravidians, and occupied the entire territory north of the Vindhya Mountains. There are but few historic allusions in the earliest part of this period, although the Rig-Veda (q.v.) mentions a battle of 10 kings against

Sudas, King of the Tritsu clan, evidently a tribal war, and contains a number of references to Aryan victories over the aboriginal tribes. The epics of the *Mahâbhârata* and the *Râmâyaṇa* contain legends of wars which must have been of much importance. (See Armies, *Ancient Armies*, Indian.) The former epic narrates almost as its main theme the strife between the Kurus and Panchalas, both on the upper Ganges, while the latter tells of the war waged by the Kosalas of Oudh against the demoniac armies of Lanka, supposed to be Ceylon. By the close of the period described in the former epic there were 10 great Hindu kingdoms: Magadha (South Behar), Anga (West Bengal), Vanga (East Bengal), Kalinga (Orissa), Avanti (Malwa), Saurashtra (Gujarat), and the kingdoms of the Andhras (Deccan), the Cholas (Coromandel), the Cheras (Malabar), and the Pandyas (extreme south). Of these Magadha became the chief before the dawn of authentic history in India. The earliest historic Indian date thus far known is 557 B.C., the reputed birth year of Buddha. Bimbisara (q.v.) of the Saisunagar dynasty began to rule soon after this (died 485 B.C.), and this line reigned until the early part of the fourth century. The invasion of Alexander the Great was to be the forerunner of a long series of inroads, which were to end 2000 years later in the final surrender of India to the West. The stay of Alexander in India was short (327 B.C.); but the Maurya king Chandragupta, called by the Greeks Sandracottus (q.v.), who brought all northern India under the sway of Magadha, entered into an alliance with the Greek ruler of Persia and Bactria, Seleucus Nicator, whose daughter he married, and to whose ambassador, Megasthenes (q.v.), we are indebted for our earliest non-Indian information on Hindustan. The capital of the Maurya kings was Pataliputra (Patna). The great Maurya Sandracottus was succeeded by his son Bindusara in 291 B.C., and his grandson, Aśoka (c.272–232 B.C.), is famous as the royal promulgator of Buddhism. A series of weak kings followed, and the foreign influence in India steadily gained strength. A Græco-Bactrian invasion was followed (100 B.C.) by a conquering raid of the Sakas, a mixture of Iranians and Greeks. These fell themselves under the sway of the Yue Chi (q.v.) tribes. The most famous Yue Chi ruler was Kanishka, a great protector of the Buddhists. The date of his reign is not generally agreed upon—Fleet placing his accession at 58 B.C., while Vincent Smith dates his reign 85–125 A.D. The Kushan kings of the Yue Chi entered into diplomatic relations with the Romans. Both the Kushan and the native central Indian dynasty of the Andhras were supplanted by the Guptas towards the end of the third century. The name of Chandragupta I (about 319) is one of the most important in this dynasty. He made his house supreme over practically all northern India, and his son, Samudragupta, was equally powerful. During the Gupta period the Hindus flourished in arts and in religion. The tradition which connects this revival of Sanskrit literature with a king of Ujjain named Vikramaditya has no historical foundation. About this time Chinese travelers, notably Fa-Hien (400), Hiouen-Thsang (643), and I-Tsing (671), came to India seeking for a knowledge of Buddha's teachings in their purity, and the records which they left form the only non-Indian information on Hindustan which we possess from the time of the Greeks until the coming of the Arabs. The power of the Guptas was finally broken in the early part of the sixth century, having previously been weakened by the invasions of the Ephtalite Huns. In the first half of the sixth century Harshavardhana, who was the hero of the one historical romance in Sanskrit, extended his sway over all northern India, even conquering Nepal. From this time the Hindu power began gradually to decline. Of the succeeding dynasties the most important were the Chalukya and Chola of Deccan, but the day of native monarchy over India was past. Petty kings came and went, warred with each other, and by their lack of harmony helped to prepare the way for the second great epoch of India, the Mohammedan period.

The subject of early Hindu eras and dates is very involved, and only the chief epochs can be given here. Hindu chronology begins with the Kaliyuga (q.v.), an astronomical era, 3102 B.C.; Chandragupta established the Maurya dynasty, 315 B.C.; the Samvat (q.v.) era (attributed wrongly to Vikramaditya) begins 57 B.C. This is the chief era of north India. The Saka (q.v.) or Salivahana (the chief south Indian) era begins 78 A.D.; the Gupta or Vallabhi era, 319 A.D.; the Harshavardhana era, 606 A.D.; the modern Burmese era, 639 A.D. According to a new theory of Bhandarkar (not accepted by scholars generally), the Saka and following dates have to be increased by 200.

Mohammedan Period (1001–1757). *House of Ghazni* (1001–1186).—The Sultan Mahmud of Ghazni, founder of the house of the Ghaznivides (q.v.), was the first conqueror who permanently established the Mohammedan power in India, and the Hindu princes fell one by one before a succession of Mohammedan dynasties. The house of Ghazni succumbed to the *House of Ghor*, which was supplanted by the *Slave Kings of Delhi* (1206–88). One of these sovereigns, Altamsh, who ascended the throne in 1211, added the greater part of Hindustan proper to his dominions. He died in 1236. *The Khilji Dynasty* (1290–1320).—Under Ala-ud-Din (1295–1316), of the house of Khilji, the Afghan power in India reached its highest point. He crushed the Hindus in Gujarat, defeated the Moguls in several battles on their invading the Punjab, and, most important of all, invaded the Deccan. Like so many Oriental conquests, however, his success was but temporary. *House of Tughlak* (1321–1414).—Ala-ud-Din's descendants having been slain, Tughlak, Governor of the Punjab, seized the throne in 1321. The Tughlak dynasty was short-lived; and in 1398, during the reign of the last of the Tughlak kings, the Tatar Timur, or Tamerlane, sacked Delhi and proclaimed himself Emperor of India. Two short-lived and unimportant dynasties followed the Tughlaks, the *House of Sayyid* (1414–50) and the *House of Lodi* (1450–1526). To the kings of this dynasty succeeded the *Great Moguls of the House of Timur* (1526–1707). Baber (q.v.), a descendant of Timur, who had for 22 years been sovereign of Kabul, invaded India for the fifth time towards the end of the year 1525, and after defeating Sultan Ibrahim Ludi on the plain of Panipat (April, 1526) he entered Delhi in triumph, and established himself as Emperor of the Mohammedan dominions in India. He died in 1530 and was succeeded by his son, Humayun. Akbar (q.v.), son of Humayun, one of the greatest of Mohammedan monarchs, became Emperor in 1556 and reigned for nearly 50 years. His son, Jehangir, ascended the throne in 1605, and his grandson, Shah Jehan (q.v.), at the beginning of 1628. Shah Jehan is celebrated as the builder of the Taj Mahal (q.v.) at Agra (q.v.), one of the most splendid monuments of Oriental architecture. In 1658 Shah Jehan was imprisoned by his son, the famous Aurungzebe (q.v.), who usurped the Imperial power. This remarkable man raised the Mogul Empire to the highest pitch of greatness and splendor. The death of Aurungzebe took place in 1707, and the decay of the Empire, which had begun a few years before, proceeded rapidly. In 1739 the Persian Nadir Shah invaded India, sacked Delhi, and carried away the famous peacock throne as well as a vast amount of treasure. Viceroys of the Great Mogul formed their provinces into independent states; while Hindu and Mohammedan adventurers carved out kingdoms with the sword. Of these the most important were the nizams of the Deccan, the rajahs of Mysore, the peshwas of the Mahrattas, and the Rajput and Sikh princes. The Mahrattas reached the height of their power about the middle of the eighteenth century, but in 1761 they sustained a crushing defeat at the hands of the Afghan ruler, Ahmed Shah (q.v.), in the battle of Panipat. The dismemberment of the Mogul Empire opened a wide field for admission and enterprise to the nations of Europe. The Venetians, the Genoese, the Portuguese (the first to reach India by way of the Cape of Good Hope in 1498), and the Dutch had by turns traded with India; and in 1602 the English appeared on the scene. See EAST INDIA COMPANY.

In 1653 Madras was erected into a presidency, and in 1668 the island of Bombay, which was the dowry of Charles II's Queen, the Infanta Catharine of Portugal, was transferred by the crown to the East India Company. The year 1686 witnessed the foundation of Calcutta. See GAMA, VASCO DA; ALBUQUERQUE; GOA; PONDICHERRY; CHANDERNAGAR.

British Rule (1757-). Great jealousy existed between the English and the French. The war for ascendancy began in 1745 and did not end until the Peace of Aix-la-Chapelle in 1748. (See DUPLEIX.) The struggle in the Carnatic continued with ardor under the pretext of supporting the claims of rival native princes to sovereignty. Clive (q.v.), one of the most famous persons in Anglo-Indian history, turned the contest in favor of the English. His memorable defense of Arcot in 1751 broke the spell of French invincibility. Five years afterward, however, Siraj-ud-Daula, Nawab or Governor of Bengal, attacked and captured Calcutta. The English prisoners, 146 in number, were confined in the small military prison known as the Black Hole, and only 23 survived till morning. Clive quickly took command of an expedition fitted out at Madras, recovered Calcutta (1757), and, assisted by Admiral Watson, prosecuted the war vigorously, till, after a hollow peace and a renewal of hostilities, he thoroughly defeated Siraj-ud-Daula in the battle of Plassey, June 23, 1757. This victory gave the English the provinces of Bengal and Behar, and from this year is dated by the English themselves the foundation of their Empire in India. From Mír Jafar, whom the East India Company appointed to succeed the defeated Nawab, they exacted vast sums of money. The government of an empire by a commercial corporation was a strange political experiment. Naturally the members had no thought of administering affairs for the benefit of their subjects, or even of far-reaching improvements in their own interest, but were guided throughout by the narrowest and most sordid selfishness. After the victory of the English at Baxar in 1764, over the united forces of Shuja-ud-Daula, Nawab of Oudh, and the Mogul Emperor (Shah Alam), the latter asked protection of the English. He confirmed the company in its possessions and granted it the collectorate (*dīwānī*) of Bengal, Behar, and Orissa, on condition of receiving the sum of £300,000 as tribute to himself from Bengal and £600,000 as an annual allowance to his Nawab. These enormous grants were soon cut down by Clive and were eventually repudiated by the company, which also failed to fulfill other engagements which it had entered into with Shah Alam. On the other hand, the cost to the company of maintaining its authority and standing army prevented it from undertaking public works and from developing the resources of the country. Clive purged the Indian government of oppression, extortion, and corruption; from the work he did during his last visit (1765-67) began a purer administration of the British Empire in the East. The Regulating Act, passed in 1773, substituted a new council of four at Calcutta in place of the far larger council which had hitherto managed affairs for the company. The new body was to assist and check the Governor-General, instituted in the same year. It was also given a limited control of the actions of the Madras and Bombay presidencies and was thus made the political head of the British possessions. To Warren Hastings (q.v.), the first Governor-General (1774-85), the new council was exceedingly hostile. Hastings, on his part, used unscrupulous means of replenishing the company's exchequer, but by his talent and energy he averted dangers which threatened the British supremacy in India. The powerful Mussulman sovereigns, Hyder (Haidar) Ali, ruler of Mysore, and the Nizam of the Deccan, assisted by French officers, combined with the Mahrattas against the English. Sir Eyre Coote broke up the confederacy, and defeated Hyder Ali in 1781. Next year the Supreme Court of Justice, which had always harassed the Governor-General, was deprived of its independent powers, and the policy of Hastings was successful, both in the council and in the field. In 1784 Pitt instituted the Board of Control under a cabinet minister. By this act the English government began to deprive the company of its monopoly of political power in India. Lord Cornwallis (q.v.), who succeeded Hastings in 1786, was both Governor-General and commander in chief. To check the corruption of the English revenue officials, he made the *zemindars* (native collectors of revenue) proprietors of their districts on condition of paying a fixed annual sum to the company. He also improved the judicial administration by forbidding a revenue official to act as a judge. These were his chief reforms. With the Nizam, the Mahrattas, and the Rajah of Coorg as allies, Cornwallis in 1790 made war on Tippu, Sultan of Mysore, who had invaded Travancore, then under British protection. Terms were dictated to Tippu at his capital, Seringapatam, and he was compelled to cede half of his domains to the company. Cornwallis was succeeded by Sir John Shore (1793–98), whose rule was in no respect memorable. Shore was followed by the Marquis Wellesley (1798–1805). The British Empire in the East, like that of Napoleon I in Europe, could be maintained only by constant fighting. Tippu broke his faith by intriguing against the English, both with the French and with native princes. His bad faith cost him his crown and life; in May, 1799, Seringapatam was stormed and Tippu killed. The Hindu dynasty displaced by Hyder Ali was restored, and the administration was carried on successfully for the young Rajah by Sir Arthur Wellesley, afterward Duke of Wellington. In the famous battle of Assaye, in 1803, he defeated the Mahrattas under Sindhia, and the victories of Lord Lake in north India extended considerably the dominions of the company. As Lord Wellesley's policy was too aggressive to suit the views of the East India Company, he was superseded by Lord Cornwallis, who returned to India only to die. Lord Minto, who governed from 1807 to 1813, organized the districts conquered by Wellesley. This administration was peaceful—a reaction of the profit-seeking company against the ambitious policy of Minto's predecessor.

The Marquis of Hastings (1813–23) conquered the Gurkhas of Nepal, forced the Mahratta ruler of Indore to cede a great part of his territories, crushed the robber gangs called Pindaris, and made the British power supreme in India. The next administrations were those of Earl Amherst (1823–28) and Lord William Bentinck (1828–35). The first was signalized by the First Burmese War, the second by the suppression of suttee and the thugs. It was Bentinck, in fact, who introduced the idea of governing India for the good of the governed. The Earl of Auckland (1836–42) followed Bentinck. He is known chiefly by his unjustifiable and disastrous attempt to make British influence paramount in Afghanistan (q.v.). An unexpected insurrection in Kabul compelled the retreat of the British army, which was overwhelmed in the Kurd-Kabul Pass (1842). Auckland was succeeded by the Earl of Ellenborough (1842–44). The "army of retribution" proceeded to Kabul soon after Lord Ellenborough took the reins of government. Kabul was sacked and several public buildings razed to the ground, after which the country was evacuated and Dost Mohammed allowed to reoccupy his throne. The conquest of Sind by Charles Napier, followed by its annexation, also belongs to this administration. Lord Ellenborough having been recalled by the East India directors, from alarm at his martial tendencies, Sir Henry Hardinge (1844–48) was sent to take his place. The attention of the new Governor-General, however, was soon diverted from works of peace to battle with the bravest people of India. Ever since the death of Runjit Singh, the ally of the English in 1839, the Punjab had been in a state of disorganization. The Sikhs, uneasy at the conquests made by the British in Sind and Gwalior, resolved to invade British territory. The First Sikh War (1845–46) commenced on the part of the Punjab by the passage of the Sutlej, and was followed by the bloody battles of Mudki, Firozshah, Aliwal, and Sobraon, in which, after hard fighting, the Sikhs were defeated with great slaughter. The result of the war was that a British resident and British troops were stationed at Lahore, although the boy prince, Dhulip Singh, was acknowledged as Maharajah under a protectorate. The Cis-Sutlej States, the Jalandhar Doab, and the region between the Ravi and the Sutlej were annexed.

The administration of the Marquis of Dalhousie (1848–56), who succeeded Hardinge, is memorable for the commencement of superb public works, the introduction of cheap uniform postage, railways, telegraphs, improvements in government, and social progress generally; a second Sikh war, ending in the victory of Gujarat, Feb. 21, 1849; a second Burmese war, finished in 1852; and the annexation of four kingdoms—the Punjab, Pegu, Nagpur, and Oudh, besides lesser territories, such as Satara. The organization of the Punjab into a model province, soon to become notable for prosperity as well as for its faithfulness to England, was a splendid achievement, of which Dalhousie had reason to be proud. When Lord Canning (1856–62) assumed office, everything promised peace and prosperity. With the early days of 1857, however, came the first mutterings of the storm that was to sweep over a large portion of British India. At the commencement of the year cakes of flour were circulated mysteriously through the region of the upper Ganges; by this means the natives were concerting rebellion. Treasonable placards appeared at Delhi, and other suspicious occurrences gave warning of native disaffection or conspiracy. The chief causes of discontent seem to have been the annexation policy and the rapid introduction of modern European improvements, which, by threatening to destroy the whole native civilization of India, roused the fears and superstitions of Hindus and Mohammedans alike. At the same time the English civil and military officials failed to respect the religious feelings of their subjects. For instance, the Enfield rifle with its cartridge, greased with tallow and lard, was at this time put into the hands of the Sepoys without explanation or precaution; and General Anson, the commander in chief, disregarded caste and was against all concession to the "beastly prejudices" of the natives. It must be remembered that the Hindu considered the cow sacred, and he would lose caste by tasting anything prepared from its meat, while the Mohammedan was not permitted by his religion to eat pork. Suddenly the disaffection broke out into open revolt before the English were aware of the impending danger. On May 10, 1857, the Sepoy Mutiny began at Meerut, a town in the neighborhood of Delhi, with a frenzied uprising of the native troops, who had been exasperated by the imprisonment of a number of their men who had refused to handle English cartridges. The mutineers liberated their comrades and proceeded to massacre the Europeans. The British troops failed to act promptly, and the Meerut Sepoys rushed to Delhi to raise the standard of the fallen Mogul. His person, invested with the traditions of native sovereignty, naturally became the centre of rebellion. Delhi at once fell into the hands of the mutineers. Nana Sahib of Bithur, whose claims as the adopted son of the Peshwa of the Mahrattas had not been recognized by the British government, fanned the insurrection. At the end of June General Wheeler was forced to surrender to him at Cawnpore; and, in spite of the promise of safe-conduct to Allahabad, all the men were immediately massacred. The women and children were butchered on July 15, by order of Nana Sahib, when he heard of Havelock's march from Allahabad. Nana Sahib was unable to withstand Havelock, who entered Cawnpore. The Europeans in the residency at Lucknow were besieged on June 30. Four days afterward, the commandant, Sir Henry Lawrence, died of his wounds, and his place was taken by Inglis, who bravely held out till he was relieved, on September 25, by the heroic Havelock. The final relief was achieved by Sir Colin Campbell, and on November 17 the city was again in complete possession of the British. In the meanwhile, in September, Delhi was retaken by Gen. Archdale Wilson. By June, 1858, no city or fortress of any importance remained in the hands of the mutineers. Oudh was entirely reduced by the beginning of the year 1859. The able rebel leader, Tantia Topi, a Mahratta Brahman, was taken, tried by court-martial, and hanged. During the mutiny valuable assistance and protection were received from many native chiefs. On the other hand, it was the fate of the last representative of the East India Company to sentence the last Great Mogul and heir of the house of Timur "to be transported across the seas as a felon." He died in Pegu in 1862. The transfer of the government of India to the British crown (1858) was the immediate consequence of the mutiny. Under the system then inaugurated, the government of India is vested in a Principal Secretary of State, responsible to the crown, and assisted by a council sitting in London. Subject to this authority is the Governor-General, henceforth termed the Viceroy, aided by an Executive Council, corresponding to the old Council of Calcutta, and by a new Legislative Council, composed in part of nonofficial members, native as well as European. The first Viceroy was Lord Canning. The two following viceroys were the Earl of Elgin (1862–63) and Sir John Lawrence (1863–69). Towards the close of Lord Elgin's administration a Mohammedan rising in northwest India was apprehended, and it was considered most desirable that the new Viceroy should have practical experience of Indian affairs. Sir John (afterward Lord) Lawrence was accordingly appointed Viceroy. He conducted the government with prudence and zeal, but unfortunate events occurred during his term of office. A war in Bhutan terminated unsatisfactorily for England in 1865; and a dreadful famine in Orissa, resulting from a drought, caused the death of 1,500,000 people. He was succeeded by the Earl of Mayo (1869–72). This administration was inaugurated by a great demonstration at Ambala, March 27, 1869, when the Ameer of Afghanistan was received in state and given a supply of arms, and the first installment of a money subsidy of £120,000 a year. In returning from Rangoon to Calcutta the Earl of Mayo was assassinated by a convict (February, 1872). Lord Northbrook (1872–76) was the next Viceroy. The chief events of his administration were "the Bengal famine," which, however, was foreseen and provided for, and the visit of the Prince of Wales to India (1875). Northbrook was followed by Lord Lytton (1876–80). The most important events in the tenure of office of Lord Lytton were the proclamation of the Queen as Empress of India (1877), another famine, and the Afghan War (1878–80). The Marquis of Ripon (1880–84), the Earl (afterward Marquis) of Dufferin (1884–88), and the Marquis of Lansdowne (1888–93) were the next three viceroys, under whose administrations much was done for the improvement of the natives. In 1885 King Thebau of Burma was dethroned, and on Jan. 1, 1886, the country was formally annexed by the English. The Earl of Elgin became Viceroy in 1893. During his term of office the demarcation of the boundary between Afghanistan and India, as determined by the Durand Treaty of 1893, was practically completed. In 1895 the region called Bashgal, in the basin of the Chitral River, was taken from the British sphere of influence and annexed to Afghanistan. In 1897 there was a serious outbreak of the Afridis on the Afghan frontier. The administration had also to contend with famine and plague. Elgin made substantial progress in internal improvements. In 1898 Lord Curzon of Kedleston became Viceroy. He devoted himself with great energy to the task of combating the plague and famine from which the country was suffering. In 1899 the gold standard was established. In 1901 the Northwest Frontier Province was organized. In 1903 an expedition was dispatched to Tibet, which by treaty of the following year was opened to British trade. Reappointed in 1904, the Viceroy incurred great unpopularity among the natives because of the partition of Bengal (q.v.) in 1905. In the same year he entered into a controversy with Lord Kitchener, commander in chief of the army, over the latter's attempt to weaken the influence of the civil authorities in military affairs, and, finding himself unsupported by the home government, resigned. He was succeeded by the Earl of Minto.

Discontent in India increased during the administration of the new Viceroy. Many Hindus who had studied in British and American universities came back determined to introduce Western political ideals among their people. The more radical element thought that this could be done only by encouraging national aspirations to repudiate British rule, which they proceeded to do by mass meetings, secret societies, and a vigorous press propaganda. The victory of Japan over Russia was a powerful stimulus in the same direction, for it demonstrated that an Asiatic nation armed with Western knowledge and trained according to Western methods of military organization could triumph over a first-class European Power.

Inevitably an aroused Indian nationalism, looking towards independence, meant hostility to British rule. Riots occurred in Madras and in the Punjab; English officials were assassinated, and a boycott called the *Swadeshi* was instituted against English goods. John Morley, the Secretary of State for India, although a champion of radical democracy, was compelled to take severe measures against this movement, for at no time since the great mutiny was British supremacy in India so vigorously challenged. Agitators were summarily imprisoned or deported, seditious meetings were forbidden, stringent laws were enacted regulating the manufacture and sale of explosives, and the Criminal Code was so amended as to permit judicial inquiry in private and trial without jury of those accused of treason.

While on one hand the government sternly put down sedition, on the other it introduced reforms. Two native Hindus were appointed on the council of the Secretary of State and one on the council of the Viceroy, and in 1908 promises were made to introduce gradually a system of representative government for India. In 1909 an Act of Parliament reorganized the various Indian legislative councils and created new executive councils. Henceforth the legislative councils were to have more power and the majority of the members were to be Hindus elected by regularly organized constituencies. These bodies are not indeed legislatures, but they do have the power to supervise the budget and to criticize the executive. The reforms had the effect of stilling somewhat the agitation against the British government. In 1910 Lord Hardinge succeeded the Earl of Minto as Viceroy. On Dec. 2, 1911, King George, accompanied by Queen Mary, came to visit his far-distant possession and to be crowned Emperor of India on Indian soil. He was the first British sovereign to take this course, and a magnificent celebration, known as the Coronation Durbar, was given in honor of the royal personages. To commemorate the occasion the King announced the transfer of the seat of government from Calcutta to Delhi, the ancient Indian capital.

In spite of these demonstrations of good will on the part of the British, the discontent of the Indians continued. On Dec. 23, 1912, an unsuccessful attempt was made to assassinate the Viceroy. The Mohammedans, hitherto friendly to the British, became restless because of the misfortunes of their coreligionists in Turkey and north Africa (1912–14). At the outbreak of the European War of 1914, however, the country seemed loyal to the British crown. Many of the Indian princes came out in hearty support of Great Britain. Indian troops were sent to France, where they greatly distinguished themselves in the battles with the Germans (see WAR IN EUROPE).

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INDIA, French. Possessions of France in India, comprising the five towns of Pondicherry, Chandernagar, Karikal, Mahé, and Yanaon (see these respective titles), with a total area of about 196 square miles. Pop., 1901, 273,185; 1909, 282,379. For history, see under East India Company, section *French East India Company;* Clive; Dupleix; La Bourdonnais.

INDIA, Further, or Farther. See Indo-China.

INDIA, Native States of. There are more than 600 native states in India which do not come under the administrative system of British India, but which have varying degrees of independence and are mostly governed by native princes. Their total area is 709,583 square miles, with a population of 70,888,854. The population is very heterogeneous, and in many of the states the ruler belongs to a minority or alien race and religion.

The early policy of the East India Company was to make alliances with the different states, recognizing the native princes as its equals. The plan did not prove satisfactory, as it was impossible to preserve harmony while the native princes were not subject to more positive restraint. The policy was then introduced of recognizing them as subordinates and limiting their military forces, the British themselves guaranteeing protection and taking charge of the external relations of these states. In the middle of the nineteenth century the policy of annexation was followed for a short time—Oudh, e.g., being annexed in 1856. But since the Sepoy Mutiny (1857) the policy has been to allow the states to enjoy a share of independence under native rulers. The extent to which the British authority is exercised varies greatly among different states and at different times in the same state. They are not permitted to make wars or to receive foreign consuls. The commercial treaties made by the British embrace also the native states, their interests being recognized as identical with those of the provinces. The guaranty of protection implies the right to establish such military forces within the native territories as the purposes of defense demand, and to have control of railroads and telegraph lines which are not "local," i.e., do not begin and end within the states. Each state is thus protected from external attack and internal revolt, and a large local army is not necessary.

Since the peace of the Empire is in danger of being broken by disputes over the succession to the rulership in any state, or the rule of certain candidates may be deemed prejudicial to the Imperial welfare, the British may intercede to determine the succession and prevent the choice of a prince objectionable to them. If flagrant and intolerable instances of misrule arise, the right of interference is presumed to follow as a further consequence from the rôle the Imperial government plays as guarantor of the protection of the states' general welfare. Under special circumstances, as, e.g., the murder of a British commissioner, the British have resorted to some extraordinary methods of interference. But ordinarily in the important states the rulers are given a free hand in determining the state policy and executing it. In the numerous small states the Imperial jurisdiction is usually much more extensive, and many of them are administered by a British officer in the name of the chieftain. The British at times have exercised absolute rule even in some of the larger states. Their rule in Mysore had extended over half a century when (1881) it was restored to native rule. Some of the states pay a tribute to the British, but it is always small, and usually by way of compensation for special services. In 1911–12 these tributes amounted to £595,005. The policy of allowing native states to exist alongside of British provinces has its advantages and disadvantages. Eminent Indian officials hold that as far as British interests are concerned it would be better to annex a number of the leading states. The fact that this is not done is assumed to be an evidence of the unselfish motives of the Imperial policy. The proximity of the native states causes such inconveniences as rise out of the different prevailing systems of currency, limitations in the development of the Imperial irrigation system, and violations of the regulations concerning the growing of the poppy. It also tends to render certain laws inoperative as, e.g., those against infanticide.

In order to facilitate the relations with the native states, to watch over the course of affairs within their territories, and be in a position to exert a needful influence, the British appoint "residents" or political agents. With rare exceptions the agent resides within the territory to which he is accredited. The agents to the principal states are under the immediate jurisdiction of the Imperial government. Hyderabad, the largest and most populous of the internal states, employs European officers and experts in the more important branches of administration. The general condition of affairs in the native states compares unfavorably with that prevailing in regions under British administration. The British claim that the burden of taxation upon the masses falls heavier in the states than in the provinces. At the same time the public is benefited much less, for the expenditure is largely for the unnecessary wants of the ruler and his coterie of adherents, while roads, irrigation, schools, and other public needs are sadly neglected. Education is progressing, but Mysore is probably the only one among the states whose educational system may be said to be on a high level. Freedom of the press is not tolerated. Laws are made or revoked as it suits the whim of the ruler. Mysore, the most progressive of the states, has a so-called "representative assembly," but its members have no vote in making the laws or appropriations. This state has had a Legislative Council since 1907. In several other states such legislative councils have been established, while in others the chiefs exercise their authority through ministers. Rural boards have also been established in this state, but they have no money at their disposal. Consult the authorities referred to under India, paragraphs *History* and *Government;* and for a more detailed statement concerning the different states, see the articles under their respective titles.

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INDIA, Portuguese. Possessions of Portugal in India, comprising Goa, Daman, and Diu. (See these respective titles.) Area, 1638 square miles. Pop., 1881, 420,868; 1900, 531,798. For history, see under India; East India Company; Dias; Gama; Almeida; Castro.

INDIA, Pride of. See China Tree.

INDIA, Star of. See Star of India, Order of the.

INDIA INK. A black pigment, formed by mixing lampblack and glue, or size, or gum, into a paste and then pressing it into molds where it dries into sticks of various shapes. It was originally made in China and Japan, where it is said to have been invented some 2600 years B.C. The best grades are still produced in those countries, the common lampblack of Occidental countries being too coarse for many purposes. It is said that the Japanese collect the lampblack used in its manufacture from the oil of sesame. In China India ink is applied with a brush, both for writing and painting. In Europe and America it is chiefly used for black-and-white drawings, it being possible to regulate the depth of the shade by the amount of water used in mixing the ink. India ink is the only true black ink produced, all other grades having a tinge of some other hue. It is made specially prepared and ready for use by draftsmen, very few of whom now grind the sticks up with water, as was once the practice.

INDIA MUSEUM. A collection in London, illustrating the antiquities, history, and resources of India. In 1880 it was placed under the management of the South Kensington Museum and has been much enlarged.

INDIANA, ĭn′dĭ-ăn′ȧ, known as the "Hoosier State." One of the Middle Western States. It lies between Ohio and Illinois and between Michigan and Kentucky, spanning the space between the Ohio River and Lake Michigan. It is crossed by many east-west trunk lines of railroad and plays the part of a bridge or "midland gap." Its boundary lines, the meridians of 84° 49′ and 87° 32′ W., the parallel of 41° 42′ N., and the Ohio and Wabash rivers, inclose an area of 36,354 square miles.

Topography. Indiana may be included in the glacial-drift plain, only about one-sixth of it having escaped glaciation. The highest land in the State, nearly 1300 feet, is in Randolph County. Morainic hills in Steuben County reach nearly 1200 feet, and a small area in Brown County lies above 1100 feet. At the shore of Lake Michigan the elevation is 581 feet, at the southwest corner of the State 484 feet, and at the mouth of the Wabash River 313 feet. The average elevation of the State is 700 feet. There are three physiographic regions: *The Lake Plain.*—The area north of the Wabash River forms a part of the Lake Plain. It is traversed by massive marginal moraines, which form belts of drift hills especially rugged and lofty in Kosciusko, Whitley, Noble, Dekalb, Lagrange, Steuben, and St. Joseph counties. The valleys contain about 1000 small lakes, of which Turkey, or Wawasee, in Kosciusko County, and James, in Steuben County, are the largest. The irregularity of surface and the numerous lakes give to this region pleasing and picturesque scenery and render it attractive for pleasure and summer resorts. The shore of Lake Michigan is bordered by a belt of sand hills, blown up by the wind to a height in some cases of 300 feet. The basins of the Kankakee and Iroquois rivers comprise extensive plains of outwash from the ice sheets which once bordered them and formerly contained large marshes, now mostly drained. A part of eastern Allen County lies in the former bed of glacial Lake Maumee and is very flat and fertile.

The Central Plain.—The Shelbyville moraine, the southernmost marginal moraine in the State, marks an important physical division. It extends in looped curves through Vigo, Parke, Putnam, Morgan, Johnson, Bartholomew, Decatur, Fayette, Wayne, and Franklin counties, and marks the south boundary of heavy glacial drift. The area between the Shelbyville moraine and the Wabash River is a smooth plain underlaid by glacial clay from 100 to 300 feet deep and broken only by shallow-stream valleys and low moraine ridges of gentle slope. This is the richest and most densely populated part of the State.

Southern Indiana.—South of the Shelbyville moraine the glacial drift is thin or absent. Strata of alternately softer and harder rock, outcropping in north-south belts, give rise to escarpments, which divide the area into east and west lowlands and a middle upland. The surface is generally hilly, with smooth tracts on the softer rocks. A prominent feature is the Knobstone escarpment, an abrupt descent to the east, which extends from Floyd County to West Bartholomew County. It takes its name from the Knobs, or steep outlying hills, which occur along its south portion. It forms the east edge of the upland of resistant rocks, about 50 miles wide, which extends from the Ohio River to Brown and Monroe counties. Most of the upland surface has been maturely dissected into a complex system of valleys, ridges, and knobs, which attain their most rugged form and highest elevation in Brown County, sometimes called the Hoosier Switzerland. The middle portion of the upland, underlaid by porous and soluble limestones, is riddled by underground drainage channels, forming sink holes, "gulfs," and caves, among which Wyandotte and Marengo caves in Crawford County rival in extent and beauty the Mammoth Cave of Kentucky. The upland held back the edge of the ice sheet and, with the southern portion of the western lowland, is devoid of glacial drift.

Drainage. The Ohio River, as far down as

Cannelton, has a valley 1 to 2 miles wide, bounded by picturesque bluffs 300 to 500 feet high. Below Cannelton it crosses softer rocks, the valley widens to 5 to 10 miles, and the bluffs are lower. It is subject to great floods, the water at Lawrenceburg sometimes rising 70 feet. It is navigable for vessels drawing 6 feet of water. The streams flowing directly into the Ohio River are short and steep. The falls of Clifty Creek, near Madison, 70 feet high, form the highest cataract in the State. The Wabash River drains two-thirds of Indiana. Its headwaters, rising from the height of land near the Indiana-Ohio line and from the northeastern hills, are largely moraine-guided. Its valley has had a complex history and is quite variable, but its course is free from falls or rapids. Below Parke County it has a wide flood plain and resembles the lower Ohio. It is navigable to Terre Haute. The numerous forks of White River rise from the east height of land and, crossing the Central Plain and middle upland, discharge to the Wabash a volume of water which rivals that of the trunk stream. The Whitewater River flows from the height of land directly to the Miami and Ohio rivers and has a rapid fall. In the north the St. Joseph drains the moraine to Lake Michigan and furnishes valuable water power. The Kankakee and Iroquois rivers flow very sluggishly westward to the Illinois. In the northeast the St. Marys and St. Joseph unite at Fort Wayne to form the Maumee, flowing to Lake Erie.

Soils. The glacial clay of the Central Plain forms one of the most productive and enduring soils in the world. The soils of the Lake Plain are more variable, the sandy and gravelly tracts being less valuable than the clay. In southern Indiana the shale and limestone soils are generally good, while those of the knobstone and sandstone are distinctly poor. Throughout the State the wide river bottoms and terraces are unrivaled for corn and wheat.

Climate and Vegetation. The mean annual temperature varies from 48° F. in the north to 56° F. in the south. The average for July ranges from 74° F. to 79° F. and for January from 24° F. to 33° F. Extremes of 106° F. and — 20° F. occur. The period between killing frosts averages about 140 days in the north and east and 200 days along the Ohio. The annual rainfall varies from 36 inches in the northwest to 42 inches in the south. Indiana is not a prairie State, seven-eighths of its area having been originally covered with a heavy growth of hardwood timber.

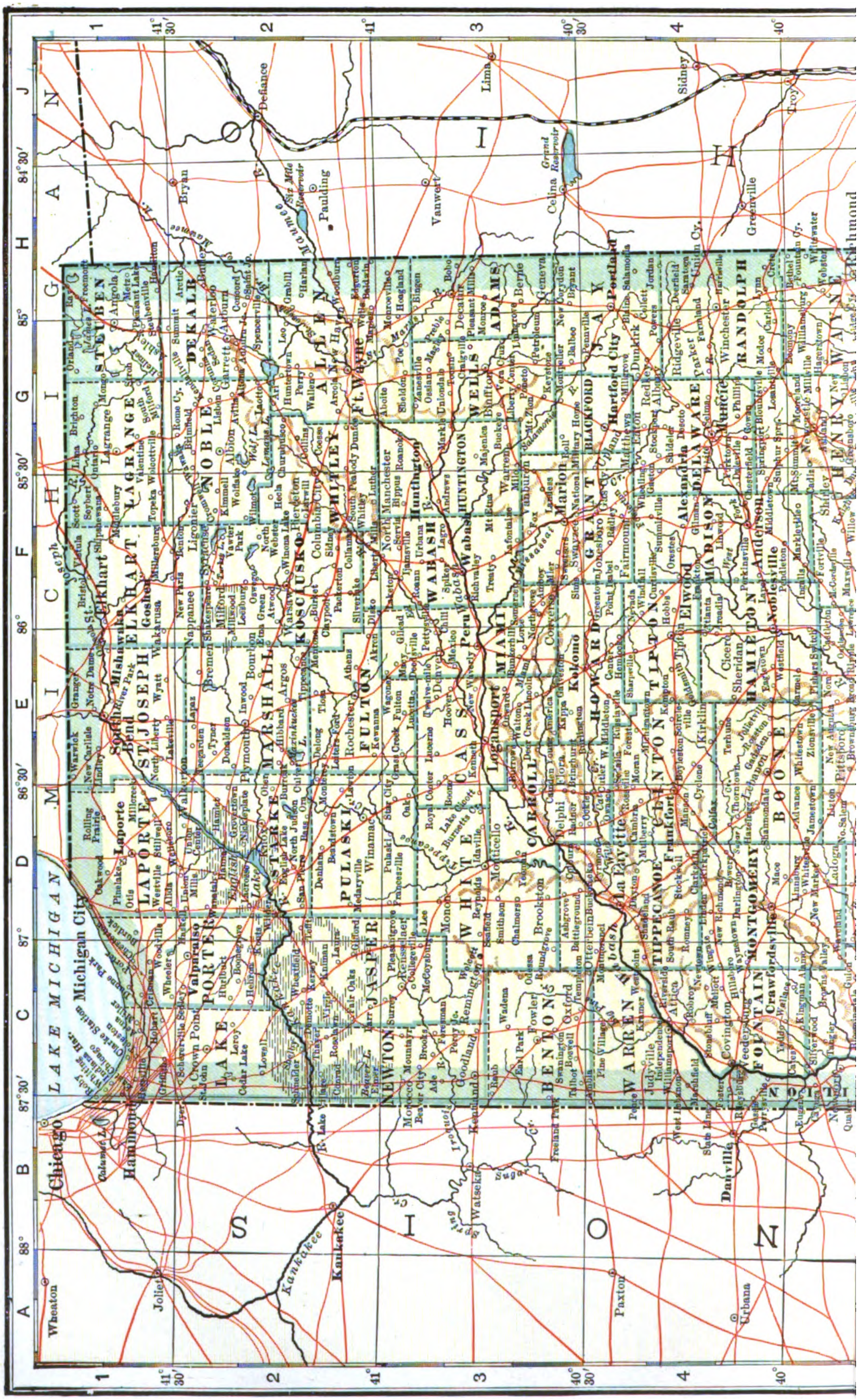
Mining. The chief mineral products of Indiana are coal, clay, cement, and stone. In the production of coal, which is a principal mineral product, Indiana ranked seventh in 1913, with an output amounting to 17,165,671 short tons, valued at $19,001,881. The principal coal-producing counties—Greene, Sullivan, and Vigo—in the southwestern part of the State, embrace an area of approximately 6500 square miles. All the coal is bituminous. Along the east edge of the fields is a series of basins, some of which are but a few acres in area, which produce a variety of coal known as block or semiblock, of a very pure, dry, noncoking nature, suitable for use in its raw state as a blast-furnace fuel, though usually mixed with coke when so used. Cannel coal is mined at several places. The beds of bituminous coal range from 3 to 10 feet in thickness, and most of the mines are worked on 5 feet or more of coal. The record production of the State was made in 1909, when, as a result of long-continued labor troubles in Illinois, an abnormal demand was created for Indiana coal, and the production rose to 18,389,815 tons. The number of men employed in the coal mines in 1913 was 22,235; the average production per man was 706 tons for the year.

The erection of 560 coke ovens at Gary has caused Indiana to assume high rank in the production of coke. In addition to the Gary plant, there are retort ovens at Indianapolis and at Muncie. Production amounted to 2,727,025 short tons, valued at $13,182,136, in 1913. Pig iron produced in 1913 was valued at over $20,600,000. Natural gas is produced in large quantities, but the value of this product decreased from $9,404,909 in 1905 to $948,278 in 1913. The petroleum field is a part of the so-called Lima-Indiana oil field. Production in 1913 was only 956,095 barrels, valued at $1,279,226, as over against 11,339,124 barrels in 1904.

The clay-working industries ranked third in importance among the mineral activities of the State in 1913, the value of these products being $8,498,646. Portland cement ranked second in value, and of this there were produced, in 1913, 10,219,492 barrels, valued at $10,218,867. The chief clay products are draintile, building brick, and vitrified brick. Cement is manufactured in the northern and southern parts. The principal quarry product of Indiana is limestone. The Bedford limestone quarried in Lawrence and Monroe counties is highly prized for structural qualities and is the principal stone product. Sand and gravel beds yield products valued in excess of $1,000,000 annually. Other mineral products are gems, lime, mineral paints, mineral waters, oilstones, pyrites, sand-lime brick, and sulphuric acid from zinc smelting. The value of the mineral products in 1913, exclusive of pig iron and coke, was $46,607,864. The total value was upward of $80,000,000.

Agriculture. The larger portion of the State is admirably adapted to agriculture. All the soils of the glacial upland are well suited to the production of corn, oats, winter wheat, and the grasses. The soils of the glacial lake region in the northwest are prevalently dark-colored, somewhat mucky loams and sandy loams, with extensive areas of peat and muck, where artificial draining has been installed. They constitute fertile land for the production of staple crops and for cabbages, onions, and celery. The silty soils of the nonglaciated region of the southern two-fifths of the State are better suited to the production of winter wheat, oats, and grass than to corn growing. Tobacco is chiefly grown upon the silty soils derived from the loess in the southwest and upon the river terraces and the glaciated upland soils along the Ohio boundary.

There was a decrease of 2.9 per cent in the number of farms and of 1.5 per cent in the acreage of farm land from 1900 to 1910. The total number of farms in 1910 was 215,485. Of an approximate land area of 23,068,800 acres, there were in farms, in 1910, 21,299,823 acres. The improved land in farms in 1910 amounted to 16,931,252 acres. The average acreage per farm in 1910 was 98.8. The total value of farm property, including land and buildings, implements and machinery, domestic animals, poultry, and bees, in 1910, was $1,809,135,238, and the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ILLINOIS
OHIO
Chicago
Hammond
Michigan City
Laporte
South Bend
Elkhart
Goshen
Valparaiso
Plymouth
Warsaw
Ft. Wayne
Rochester
Peru
Wabash
Huntington
Logansport
Kokomo
Marion
Hartford City
Portland
Muncie
Anderson
Frankfort
Lafayette
Crawfordsville
Kankakee
Joliet
Wheaton
Danville
Urbana
Paxton
Watseka
Defiance
Bryan
Paulding
Vanwert
Lima
Celina
Sidney
Greenville
Troy
Richmond
STEUBEN
LAGRANGE
ELKHART
ST. JOSEPH
LAPORTE
PORTER
LAKE
NOBLE
DEKALB
ALLEN
WHITLEY
KOSCIUSKO
MARSHALL
STARKE
JASPER
NEWTON
PULASKI
FULTON
WABASH
HUNTINGTON
WELLS
ADAMS
MIAMI
CASS
WHITE
BENTON
CARROLL
HOWARD
GRANT
BLACKFORD
JAY
DELAWARE
MADISON
TIPTON
CLINTON
TIPPECANOE
WARREN
FOUNTAIN
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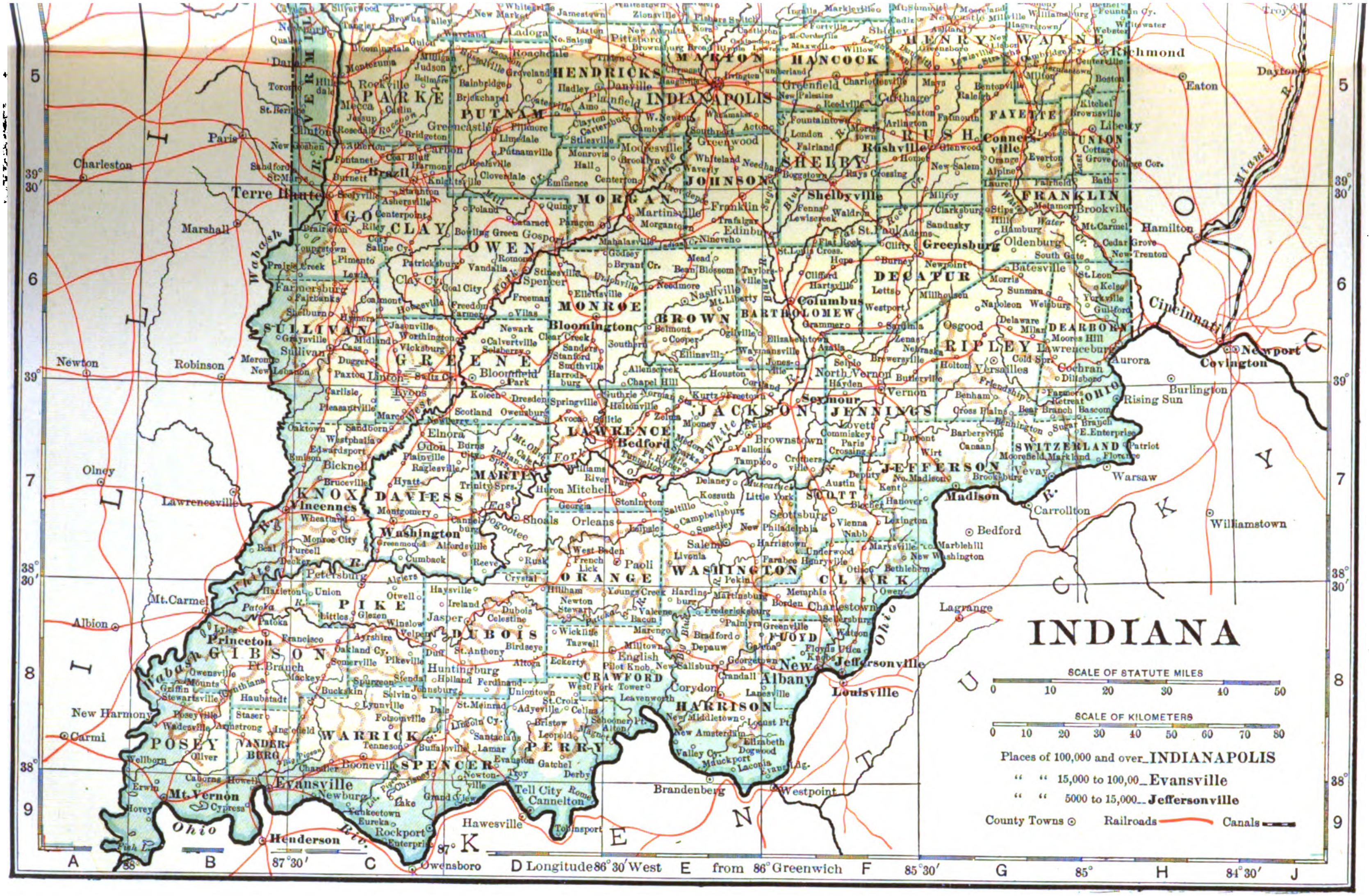
INDIANA
SCALE OF STATUTE MILES
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SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80
Places of 100,000 and over_INDIANAPOLIS
" " 15,000 to 100,00_Evansville
" " 5000 to 15,000_Jeffersonville
County Towns
Railroads
Canals
Longitude West from Greenwich

average value of land per acre, $62.36. Of the total number of farms, in 1910, 150,798 were operated by owners and managers and 64,687 by tenants. There were 805 negro and nonwhite farmers in 1910, as against 204,951 native and foreign-born white.

The following table shows the acreage, production, and value of the principal crops in 1914, as estimated by the United States Department of Agriculture. The total value of the crops in 1909 was $204,210,000. The general character of Indiana agriculture is indicated by the fact that about three-fourths of the total value of crops in 1909 was contributed by the cereals and about one-eighth by hay and forage. The remainder, representing in value about 13.4 per cent of the total, consisted chiefly of potatoes and other vegetables, forest products, and fruits and nuts. Orchard fruits are an important product; the total quantity produced in 1909 was 4,714,000 bushels, valued at $3,709,000. These consisted of apples, peaches, nectarines, pears, plums, prunes, quinces, and grapes. Nuts and small fruits are other important crops, black walnuts constituting the chief item of the former and strawberries of the latter.

CROPS	Acreage	Prod. bu.	Value
Corn	4,949,000	163,317,000	$94,724,000
Wheat	2,485,000	43,239,000	44,536,000
Oats	1,575,000	44,888,000	19,302,000
Barley	8,000	200,000	134,000
Rye	99,000	1,614,000	1,372,000
Potatoes	75,000	6,000,000	3,360,000
Hay	1,764,000	*1,764,000	24,872,000
Tobacco	13,500,000	†12,150,000	1,094,000

* Tons. † Pounds.

Live Stock and Dairy Products.—The number and value of domestic animals on farms on Jan. 1, 1915, according to the estimates of the United States Department of Agriculture, were as follows: cattle, 693,000, valued at $24,394,000; horses, 854,000, valued at $97,356,000; mules, 86,000, valued at $10,062,000; swine, 4,167,000, valued at $42,920,000; sheep, 1,114,000, valued at $6,016,000; milch cows, 646,000, valued at $35,530,000. During 1909 194,736,962 gallons of milk were produced. From this 43,181,817 pounds of butter were made, valued at $9,402,994, and 63,619 pounds of cheese, valued at $7,800. The total value of dairy products sold in 1909 was $16,666,374. Poultry of all sorts on the farms, on April 15, 1910, numbered 13,739,109, valued at $7,762,015.

Forest Products.—Of the total number of farms, in 1909, 75,397 reported forest products, the total value being $5,603,322. These include firewood, fencing material, logs, railroad ties, telegraph and telephone poles, materials for barrels, bark, and naval stores. There were cut, in 1909, 556,418 M feet of rough lumber, 3600 thousand lath, and 7340 thousand shingles. Practically the entire output in 1909 was hard wood, 41.1 per cent of which was oak, the remainder being made up of numerous varieties, of which beech, maple, and elm were the most important.

Manufactures. From 1849, when Indiana ranked fourteenth among the States in the value of its manufactures, with a total value of products of $18,725,000, the State has in each decade shown a large increase. In 1909 the value of manufactured products amounted to $579,075,000, and the State ranked ninth. This growth has been dependent largely upon the natural resources. During the decade 1900–10 the supply of timber, petroleum, and natural gas fell off greatly, and some of the industries depending upon these materials showed a decrease in their output or less advance than in previous years. The manufacturing industries of the State as a whole, however, have continued to flourish; lumber has been secured from outside the State to supplement the local supply, while the increasing amount of coal mined in the State has compensated largely for the smaller supply of natural gas and has stimulated manufacturing in many lines.

In 1849 an average of 14,440 wage earners, representing 1.5 per cent of the total population, were employed in manufactures, and in 1909 an average of 186,984 wage earners, or 6.9 per cent of the total population, were so engaged. During this period the gross value of products per capita of the total population increased from $19 to $214. The proportion which the manufactures of the State represented of the total value of products of manufacturing industries for the United States increased from 1.8 per cent in 1849 to 2.8 per cent in 1909. The table on pages 90 and 91 gives the most important data relating to the manufactures of the State for 1909 in comparison with 1904. On account of limitations of space only those industries whose products had a value of $1,000,000 or more in 1909 are included in this table.

The value added to products by manufacture best represents the net wealth created by manufacturing operations. During the year $121,816,000 were paid out in salaries and wages. The average number of wage earners in 1909 was 186,984. Of these 163,698 were men and 23,286 women. There were employed 3612 children under 16 years of age. For the great majority of wage earners employed in the manufacturing industries the usual hours of labor in 1909 ranged from 54 to 60 hours a week. The totals presented in the table do not include the statistics for an establishment operated by the Federal government, the general depot of the Quartermaster's Department, located at Jeffersonville. In 1909 this plant employed an average of 590 wage earners, and the products, which consisted principally of clothing, were valued at $401,801.

The most important industries in the point of value of products are those connected with slaughtering and meat packing, the value of products of these industries amounting to $47,289,000 in 1909. Second in value are the products of the flour and gristmill industries, the outgrowth of the large crops of cereals grown in Indiana. The value of products in 1909 was $40,541,000. The most important output is that of white flour, amounting to $4,784,708 barrels in 1909. Industries connected with iron and steel, including steelworks and rolling mills, have shown increased importance. The value of the product in 1909 was $38,652,000. The establishment of large steelworks and rolling mills at Gary, in the northern part, on Lake Michigan, has been largely responsible for a gain of 800 per cent in value of product since 1889. The importance of the iron and steel industry as a whole is much greater than is indicated by the figures in the table, since the statistics of blast furnaces and for the manufacture of tin plate and terneplate can-

COMPARATIVE SUMMARY FOR 1909 AND 1904

THE STATE — ALL INDUSTRIES COMBINED AND SELECTED INDUSTRIES

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY		Capital	Wages	Value of products	Value added by manufacture
			Total	Wage earners (average number)	Expressed in thousands			
All industries	1909	7,969	218,263	186,984	$508,717	$95,511	$579,075	$244,700
	1904	7,044	176,227	154,174	312,071	72,058	393,954	173,447
Agricultural implements	1909	39	6,061	4,749	23,008	2,565	13,670	8,806
	1904	41	3,947	3,543	14,523	1,841	8,061	5,086
Automobiles, including bodies and parts	1909	67	7,753	6,797	16,722	4,131	23,764	8,769
	1904	11	921	816	1,194	496	1,639	815
Brass and bronze products	1909	21	534	468	878	292	1,379	605
	1904	9	118	101	119	55	175	90
Bread and other bakery products	1909	754	3,780	2,505	6,044	1,315	10,209	3,983
	1904	581	3,082	2,115	3,859	994	6,935	2,804
Brick and tile	1909	311	4,361	3,788	7,455	1,835	4,719	3,413
	1904	392	4,009	3,335	5,449	1,403	3,818	2,836
Butter, cheese, and condensed milk	1909	132	807	488	1,042	262	3,959	763
	1904	87	324	187	362	98	1,291	280
Canning and preserving	1909	134	3,952	3,406	5,572	879	8,758	2,813
	1904	110	3,750	3,426	3,982	862	5,894	2,320
Carriages and wagons and materials	1909	221	10,100	8,867	29,110	4,355	21,655	9,197
	1904	252	10,601	9,406	25,879	4,184	19,259	8,390
Cars and general shop construction and repairs by steam-railroad companies.	1909	34	13,745	12,884	9,942	8,081	17,128	9,252
	1904	44	12,020	11,348	5,147	6,664	14,515	7,509
Cars, steam-railroad, not including operations of railroad companies.	1909	7	4,449	4,084	14,884	1,991	9,498	3,189
	1904	6	3,341	3,252	5,304	1,928	10,036	3,192
Cement	1909	11	2,616	2,318	7,271	1,280	7,022	2,863
	1904	6	817	788	2,144	381	1,283	861
Clothing, men's, including shirts	1909	42	4,444	4,073	4,617	1,305	8,029	3,377
	1904	41	4,081	3,761	2,335	994	5,420	2,158
Clothing, women's	1909	18	1,403	1,291	851	449	2,058	1,001
	1904	27	1,781	1,606	906	484	2,109	1,121
Coffins, burial cases, and undertakers' goods	1909	19	824	669	1,494	313	1,448	747
	1904	17	575	494	1,194	217	1,107	635
Confectionery	1909	64	1,134	885	949	298	2,558	1,035
	1904	43	884	685	870	228	1,530	699
Cooperage and wooden goods, not elsewhere specified.	1909	57	1,016	891	1,476	382	2,398	899
	1904	59	1,139	1,022	1,397	433	2,777	993
Copper, tin, and sheet-iron products	1909	146	2,485	2,121	6,814	1,065	5,763	2,332
	1904	91	1,286	988	4,504	440	2,885	1,387
Cotton goods, including cotton small wares	1909	7	1,621	1,582	2,473	478	2,502	832
	1904	5	1,208	1,174	2,277	302	1,484	344
Electrical machinery, apparatus, and supplies	1909	42	3,723	3,073	6,857	1,361	7,718	4,025
	1904	34	1,813	1,416	3,175	664	2,857	1,790
Flour-mill and gristmill products	1909	563	3,508	2,298	15,857	1,216	40,541	5,539
	1904	566	3,464	2,289	11,907	1,091	36,474	5,132
Foundry and machine-shop products	1909	415	18,439	15,809	39,711	8,857	39,884	21,265
	1904	346	14,690	12,866	25,858	6,356	25,595	13,934
Furniture and refrigerators	1909	201	12,352	11,284	16,537	5,137	18,456	9,996
	1904	186	10,760	9,955	12,063	4,044	13,959	8,243
Gas, illuminating and heating	1909	53	1,390	928	23,550	508	3,147	2,045
	1904	43	826	621	11,972	289	1,839	1,268
Glass	1909	44	9,936	9,544	13,149	4,942	11,593	6,865
	1904	96	12,470	12,020	13,884	6,638	14,707	9,148
Glucose and starch	1909	4	944	866	4,265	480	5,750	1,068
	1904	4	510	462	1,187	249	2,048	549
Ice, manufactured	1909	85	765	563	3,318	304	1,311	985
	1904	66	547	391	2,204	199	748	587
Iron and steel, steelworks and rolling mills	1909	17	13,206	12,255	47,781	8,390	38,652	12,553
	1904	21	7,538	7,215	22,986	4,072	16,920	6,014

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY		Capital	Wages	Value of products	Value added by manufacture
			Total	Wage earners (average number)	Expressed in thousands			
Leather goods	1909	118	1,582	1,240	3,108	527	3,406	1,404
	1904	90	1,107	911	1,457	388	1,998	900
Leather, tanned, curried, and finished	1909	10	440	398	2,213	205	2,311	598
	1904	13	301	265	1,248	134	1,051	287
Liquors, distilled	1909	14	527	428	5,556	269	31,610	26,898
	1904	18	394	337	1,820	190	20,520	17,522
Liquors, malt	1909	37	1,923	1,594	10,571	1,019	8,313	6,324
	1904	41	1,633	1,313	9,073	794	6,196	4,434
Lumber and timber products	1909	1,277	12,840	10,317	19,177	4,492	23,135	10,753
	1904	994	11,739	9,704	13,816	4,226	21,476	9,724
Marble and stone work	1909	200	3,811	3,283	7,441	1,943	5,756	3,969
	1904	128	2,466	2,157	3,193	1,129	3,399	2,222
Mattresses and spring beds	1909	27	644	553	1,456	257	1,287	596
	1904	26	523	458	743	170	854	417
Musical instruments, pianos and organs and materials.	1909	15	1,985	1,667	4,270	994	3,686	1,983
	1904	12	1,420	1,237	2,617	630	2,270	1,386
Paint and varnish	1909	18	297	200	841	74	1,108	425
	1904	14	140	81	580	42	748	311
Paper and wood pulp	1909	27	1,627	1,501	7,132	754	5,202	1,705
	1904	36	1,737	1,620	6,511	664	3,917	1,400
Paper goods, not elsewhere specified	1909	8	816	719	3,403	256	1,887	663
	1904	3	392	359	465	132	779	234
Patent medicines and compounds and druggists' preparations.	1909	113	1,481	801	2,858	354	4,344	2,884
	1904	100	1,211	813	2,274	292	4,410	2,956
Pottery, terra-cotta, and fire-clay products	1909	31	2,373	2,186	4,806	1,190	2,966	2,107
	1904	38	2,200	2,019	3,837	981	2,643	1,997
Printing and publishing	1909	892	9,600	6,756	11,844	3,522	14,356	10,331
	1904	865	8,295	5,819	9,449	2,941	11,473	8,298
Slaughtering and meat packing	1909	61	4,862	4,423	8,058	2,161	47,289	5,303
	1904	50	3,400	3,155	7,424	1,371	29,435	3,186
Stoves and furnaces, including gas and oil stoves	1909	24	1,609	1,362	2,853	723	2,751	1,730
	1904	23	1,210	1,070	1,704	589	2,030	1,223
Tobacco manufactures	1909	470	3,416	2,794	1,408	1,126	4,155	2,565
	1904	552	3,414	2,668	1,586	1,040	3,905	2,324
Wirework, including wire rope and cable	1909	31	834	689	1,192	314	3,161	819
	1904	25	589	472	1,059	209	1,696	560
Woolen, worsted, and felt goods, and wool hats.	1909	11	825	776	1,555	293	1,570	514
	1904	18	1,038	993	1,645	306	1,597	600

not be shown without disclosing the operations of individual establishments.

Indiana is one of the most important States in the manufacture of distilled liquors. The manufacture of automobiles has become of great importance. In 1899 there was but one establishment engaged in this industry; in 1909 there were 67 establishments, the value of whose products amounted to $23,764,000. These figures are not complete, for the manufacture of automobile bodies and parts is so interwoven with other industries that it is not possible to show how fully the statistics show the magnitude of the industry. Other important manufacturing industries are those connected with the manufacture of carriages and wagons, furniture and refrigerators, agricultural implements, and glass. In the last-named product the State ranks third. Its growth dates from 1886, when natural gas was discovered in the State, and it attained second place in 1899. The reduction of the output of natural gas checked its growth in the next decade.

Indianapolis is the most important city in the value of manufactured products. These were valued at $126,522,113 in 1909. The other ranking cities with the value of their products are South Bend, $27,854,527; Fort Wayne, $23,686,809; Evansville, $22,829,024. Cities the value of whose products exceeded $10,000,000 were Terre Haute, Hammond, Anderson, Mishawaka, and Richmond. The city of Gary is not included in this list. For further information in regard to manufacturing cities mentioned, see titles of these cities in other portions of this work. In all the manufacturing industries of the State combined, 29.7 per cent were in 1909 under corporate ownership. Of the total value of products, however, the establishments operated by corporations in 1909 furnished 85.6 per cent, as against 14.4 per cent for those under all other forms of ownership.

Transportation. The State has fairly good facilities for water transportation. The Ohio River forms the entire southern boundary, and its tributary, the Wabash, is navigable at high water as far as Lafayette. On the north is Lake Michigan. During the early history of the State the National Road, running east and west through the central part, was an important thoroughfare. Two canals—one the Wabash and Erie and the other the White Water—have been superseded by railroads. The railway facilities are exceptionally well developed. All lines from the East centring in Chicago pass through the State, as do most of the lines connecting the great commercial centres of the East with those of the West. There are in addition some important north to south lines. The total mileage of railways on Jan. 1, 1913, was 7359, and of this 4688 miles were main lines. There were on Jan. 1, 1913, 45 companies operating or leasing electric railroads. The general administration of railways is in the hands of the Railroad Commission of Indiana. Rates were made subject to its decision, and it is permitted to suspend any rate for 30 days. An Act also passed in this year deals with the liability of common carriers and includes a bill-of-lading law.

Banks. There were on June 4, 1913, 255 national banks, with capital amounting to $27,896,000 and deposits of $144,162,000. There were 348 State banks, with deposits subject to check aggregating $41,923,947 and savings deposits of $7,319,277. The savings banks numbered 5, with 33,205 depositors and deposits amounting to $13,001,084. There were also 134 loan and trust companies, with deposits subject to check amounting to $18,052,393 and savings deposits amounting to $39,036,937. The private banks numbered 194, with deposits subject to check amounting to $15,434,904 and savings deposits amounting to $1,483,195.

Government. The present constitution was adopted in 1851, and it is the second under which the State has been governed. Amendments to the constitution may be proposed in either branch of the General Assembly; and if agreed to by a majority of the members elected to each of the two Houses, in two successive sessions, it shall then be the duty of the General Assembly to submit them to the electors. If a majority shall ratify the same, the amendment shall become part of the constitution. An amendment must receive a majority of all the votes cast at the election and not merely a majority of the votes cast for or against the amendment. The Legislature of 1911 proposed a new constitution to be submitted to the people in 1912, but the method of drafting and adopting this instrument was declared unconstitutional by the State Supreme Court.

Legislative.—Legislative authority is vested in a General Assembly, which consists of Senate and House of Representatives. The Senate must not exceed 50, nor the House of Representatives 100 members. Senators are elected for a term of four years and Representatives for a term of two years. Enumerations for the apportionment of Senators and Representatives are held every six years. Such an enumeration was held in 1914. The sessions of the General Assembly are held biennially, commencing on Thursday after the first Monday in January. The Governor may by proclamation call special sessions.

Executive.—Executive power is vested in a Governor, who holds office for four years and is not eligible for election for more than four years in any period of eight years. The administrative officers are a Secretary, Auditor, and Treasurer. These are elected for a term of two years and are not eligible to office more than four years within a period of six.

Judiciary.—The judicial power is vested in the supreme court, appellate court, circuit court, and such other courts as may be established by the General Assembly. The supreme court consists of from three to five judges, who hold office for six years. The State is divided into as many districts as there are judges of the supreme court, such districts being formed of contiguous territory, as nearly equal in population as is possible. One judge, a resident, is elected from each district by the electors at large. The circuit courts each consist of one judge elected from the judicial circuits into which the State shall be divided from time to time. There is elected in each judicial district a prosecuting attorney, who holds office for two years. There are also probate, juvenile, and superior courts, the judges of which hold office for four years.

Suffrage and Elections.—Voters must be male citizens of the United States who have attained their majority and who have lived in the State six months immediately preceding the election, in the township 60 days, in the ward or precinct 30 days. Males of foreign birth who have declared intention of obtaining citizenship, conformably to the national laws of naturalization, are also eligible to vote. These qualifications are fixed by the constitution and cannot be changed by the Legislature. The general elections are held every Tuesday after the first Monday in November. Indiana is one of the States in which no provision has been made for direct primaries or direct nomination of candidates for office.

Local and Municipal Government.—As noted above, the county officers are a clerk of the circuit court, auditor, recorder, treasurer, sheriff, coroner, and surveyor. No person shall be elected or appointed a county officer who is not an elector of the county. The General Assembly has power to confer upon the boards doing county business powers of a local administrative character. This has reference to the boards of county commissioners which are the principal governmental agencies of the county. Indiana is one of the States in which the Legislature has no provision for a commission form of government in towns and cities.

Other Statutory Provisions.—Combinations in restraint of trade are illegal, and all persons engaged in such combinations are guilty of misdemeanor and are liable to a fine not to exceed $5000 and to imprisonment. A pure food law conforming in its essential provisions to the national law was passed in 1907 and revised in 1911. The employment of children under 14 years of age in other than farm work or domestic service is prohibited. There is a stringent employers' liability act. The selling of liquor is regulated by a city and township local-option measure, passed in 1911, nullifying the county option law previously in force. A remonstrance law, adopted in 1905, affords the people an opportunity to abolish saloons in townships also. The remonstrance feature also applies to city wards and the local-option feature to all municipalities. At the end of 1913, of the 94 cities in the State 30 were "dry," and of 360 incorporated towns about 300 were without a saloon. Of the townships, which number about 1015, about 825 had voted "no license."

Finance. The report of the Treasurer for the fiscal year ending Sept. 30, 1914, shows that receipts for that period amounted to $12,545,007 and disbursements for all purposes to $12,273,314, leaving a balance of $629,964. The State debt at the end of the fiscal year was $1,470,163. Of this, $1,064,548 was domestic debt and $405,615 was foreign debt. The per capita debt in 1912 was only $0.49, compared with the per capita debt of the whole country, $3.52.

Militia. The total number of males available for military duty in 1910 was 647,449. The organized militia consists of one brigade of infantry, a battalion of field artillery, a company of signal troops, and a company of sanitary troops, including an ambulance company and a field hospital. The infantry brigade consists of three regiments of 12 companies each, and the field artillery of one battalion and three batteries. The number of enlisted men in 1913 was 2297, and the officers numbered 179.

Population. The population of the State by decades is as follows: 1800, 5641; 1810, 24,520; 1820, 147,178; 1830, 343,031; 1840, 685,866; 1850, 988,416; 1860, 1,350,428; 1870, 1,680,637; 1880, 1,978,301; 1890, 2,192,404; 1900, 2,516,462; 1910, 2,700,876. The estimated population on July 1, 1914, was 2,779,467. Indiana has been much less affected by immigration than most of the other Middle Western States. A large percentage of the population came originally from the South—Kentucky, North Carolina, and Virginia—and was to a large extent unaffected by the Western wave from New England and New York. Of the total population in 1910, 78.9 per cent were native whites of native parentage; 13 per cent were native whites of foreign or mixed parentage; 5.9 per cent were foreign-born whites, and 2.2 per cent were negroes. The population per square mile in 1910 was 74.9, compared with 70.1 in 1900. The urban population in 1910 was 1,143,835, compared with 876,294 in 1900. The rural population in 1910 was 1,557,041, compared with 1,640,168 in 1900. The male population in 1910 numbered 1,383,295, and the female 1,317,581. There were in 1910 five cities with a population of 25,000 or over: Indianapolis, 233,650; Evansville, 69,647; Fort Wayne, 63,933; Terre Haute, 58,157; South Bend, 53,684. Other important cities are Muncie, 24,005; Anderson, 22,476; Richmond, 22,324; Hammond, 20,925; Lafayette, 20,081. The city of Gary, which did not exist in 1900, had in 1910 a population of 16,802. There were, in 1910, 89 cities with a population of 2500 or over.

Education. The educational standards of the State have always been high, and the administration of the school system has rapidly improved in recent years. The Legislature has passed many excellent measures tending to keep up the high standard of the administration and instruction.

The proportion of illiteracy is low. In 1910 there were 66,213 illiterates over 10 years of age—a percentage of 3.1 per cent of the total population, a decrease from 4.6 per cent in 1900. The illiterates of native parentage form only 2.2 per cent of the population of 10 years or over. The percentage of illiteracy amongst the negroes was 13.7 per cent, a decrease from 22.6 per cent in 1900. In 1914 there were 766,383 persons of school age and an enrollment of 548,497. Education is compulsory; all children between the ages of 6 and 14 are obliged to attend a full term in a local school. The minimum school term is fixed by law as six months, and the average length varies from 140 days in township schools to 187 days in city schools.

There were, in 1912, 373 commissioned and 425 noncommissioned high schools. Secondary education has had an interesting development. Seminaries, established in each county by law in 1831, have gradually been superseded by the free public high schools, the first of which was organized in 1850 in Adamsville, and in 1873 the first step was taken towards their standardization. In 1907 high schools were defined as part of the common-school system and classified as commissioned and noncommissioned. The commissioned high schools were further classified to include noncommissioned schools reaching a certain standard. Vocational and industrial education has been an important part of the educational system, and in 1913 the General Assembly passed very good laws in this regard. Laws were also passed in this year relating to school sanitation and health supervision.

The consolidation of the rural schools has improved the system of grading and has established an advanced district high school. Several counties employ supervisors for the rural schools to overlook the work, advise and direct the teachers. The department of agriculture of Purdue University has in recent years carried on a campaign for the organization of corn, potato, and tomato raising and canning clubs for boys and girls.

A large proportion of the teachers have received a collegiate and normal-school training. The State has always been liberal in the support of schools. The common-school fund on June 1, 1912, amounted to $8,960,113, and the congressional township fund to $2,475,856. The total amount distributed for the support of schools in 1912 was $16,443,654. Of this $9,910,801 was expended for teachers. The average yearly salary of teachers of all grades in the high schools was $566.20 in 1912. The township institute is an important feature of the educational system; at least one Saturday in each month during the school term is devoted to township institutes or model schools for the improvement of teachers, the work being outlined each year by the State Superintendent of Education. This feature has been a powerful factor in rural education, being the means by which teachers with little supervision may exchange ideas and methods and coöperate for the advancement of education.

There are a number of special schools—for the education of the blind, for the education of deaf mutes, the Indiana Boys' School, the Indiana Industrial School for Girls, Soldiers and Sailors Home, the Indiana Reformatory, School of Letters, and the Indiana School for Feeble-Minded Youths. There are normal schools at Indianapolis, Terre Haute, Danville, Marion, Muncie, and Angola. The institutions of higher learning are Indiana University at Bloomington (coeducational), St. Joseph's College at Collegeville, Wabash College at Crawfordsville, Earlham College (coeducational) at Earlham, Concordia College at Fort Wayne, Franklin College at Franklin, Goshen College at Goshen, De Pauw University at Greencastle, Hanover College at Hanover, Butler College at Indianapolis, Purdue University at Lafayette, Moores Hill College at Moores Hill, Taylor University at Upland, Valparaiso University at Valparaiso, and Vincennes University at Vincennes. The last-named 10 colleges are all coeducational. There are also St. Mary's College and Academy for Women, University of Notre Dame at Notre Dame, and St. Meinrad College at St. Meinrad. These three are under the auspices of the Roman Catholic church. The Rose Polytechnic Institute at Terre Haute is an important scientific institution.

Charities and Corrections. There were, in 1914, 17 State charitable and correctional institutions. These included the Central Hospital for the Insane at Indianapolis, the Eastern Hospital for the Insane at Richmond, the Northern Hospital for the Insane at Logansport, the Southern Hospital for the Insane at Evansville, the Southeastern Hospital for the Insane at Madison, the Soldiers Home at Lafayette, the School for Feeble-Minded Youth at Fort Wayne, the Village for Epileptics at New Castle, the School for the Deaf and the School for the Blind at Indianapolis, the State Prison at Michigan City, the State Reformatory at Jeffersonville, the Indiana Girls School at Clermont, and the Indiana Boys School at Plainfield. These institutions on Sept. 30, 1913, had 12,529 inmates, and for the fiscal year 1911-12 there were expended for their support $2,318,347, an average of $202.69 per inmate. In addition to maintenance expense the institutions spent $316,443, or a grand total of $2,634,791. Under a law enacted in 1909, all these institutions operate under a uniform plan of administration. A bipartisan board of four trustees for each institution is appointed by the Governor; these boards appoint their respective superintendents; the superintendents appoint and discharge their subordinates, who under the law must be selected on account of their fitness, without regard to political or religious affiliation. All these charitable and correctional agencies are under the supervision of the Board of State Charities, created by the Legislature of 1889. Its purpose is the supervision of the whole system of public charities of the State; its duties are to see that every inmate of every public institution receives proper care, that the public funds are properly expended, that the institutions are properly conducted, and that their management is protected from unjust criticism.

Religion. The Methodists from the pioneer days to the present have been the leading denomination, having more members in Indiana in proportion to the total State membership of all churches than in any other Northern State. In recent years the "Christian" church has had a phenomenal growth. The Roman Catholics are proportionally weaker than in any other Northern commonwealth. Altogether 55 different denominations are represented. Besides those mentioned, the most important are the Lutherans, Baptists, Presbyterians, United Brethren, and Friends.

History. French trappers and fur traders appeared within the present limits of Indiana as early probably as 1679. It is certain that La Salle, on his way to the Illinois Indians, crossed the northwestern part of the State by way of the Kankakee in 1680. The Miamis and Ouabachi (or Wabash) Indians then occupied the region and welcomed the French, who built Fort Ouatanon, on the Wabash, in 1720, and Fort Vincennes in 1727. The first permanent settlement was founded in 1734-35, by a number of families who made their home in the neighborhood of Fort Vincennes. The population increased slowly; but, owing to the richness of the soil, the inhabitants (French entirely, together with negro and Indian slaves) enjoyed ease and great plenty. The territory came into the possession of England in 1763, but the English occupation was too brief to effect any change in the people or the laws. In 1778-79 George Rogers Clark (q.v.), with a handful of men, wrested the country from Great Britain. Hostilities with the Indians, continuing from 1781 to 1795, when a peace was conquered by General Wayne, brought great distress upon the settlers at Vincennes. In May, 1800, the Indiana Territory was organized, comprising all that portion of the Northwest Territory lying west and north of Ohio. Michigan and Illinois were subsequently set off, reducing Indiana to its present extent. The capital was moved from Vincennes to Corydon in 1813 and to Indianapolis in 1825. In 1811 Gen. William H. Harrison (q.v.), at the head of a force of regulars and militia, crushed the Indian tribes under the brother of Tecumseh at the battle of Tippecanoe (q.v.). When the war with England broke out, the Indians renewed hostilities; but they were speedily subdued and nevermore troubled the settlers. As in the case of Illinois, a large proportion of the immigrants into Indiana came from the South, and before 1816 repeated attempts were made to legalize slavery in the Territory, in spite of the Ordinance of 1787. In 1816, the year of the State's admission into the Union, the question was definitely settled against slavery by the first constitutional convention, though a law prohibiting negroes and mulattoes from immigrating into the State remained in force till after the Civil War. The growth of the State in wealth and population was accelerated greatly by the construction of the National Road and the Wabash and Erie canals. Wild speculation in lands and railroads led to a general bankruptcy in 1837; but after 1846, when a compromise with the public creditors was effected, the economic and financial condition of the State improved steadily. Its prosperity since the Civil War has been due in great measure to the discovery of extensive coal, iron, and gas fields, and valuable deposits of building stone, in different parts of the State. Conditions have been monotonously peaceful, except for spasmodic eruptions of mob violence, notably in the years 1869 and 1888, and the disorders around Hammond attending the great railway strike of 1894, when strikers and Federal troops came into conflict. As a result of the strike, a board of labor commissioners was created in 1897 to act as a permanent tribunal of arbitration. In the same year an antitrust law and a factory-inspection law were passed, and primary education was made compulsory. For more than 20 years after 1878 the State balanced almost perfectly between the two great political parties, vacillating, in State elections especially, from side to side by minute majorities in a total vote of several hundred thousand. The opportunity for political manipulation was correspondingly great, and in national elections every device known to practical politics was brought into play to gain the electoral vote of the State.

Lawmaking was carried on frequently in a partisan spirit, and it was a favorite manœuvre with the minority in the Legislature, Republican or Democrat, whenever it was hopelessly outnumbered on an important question, to resign in a body, so as to prevent a quorum and thus block legislation. In national elections the State was Democratic up to 1860, excepting in the years 1836 and 1840, when it cast its vote for William H. Harrison, the Whig candidate. It was Republican from 1860 to 1872, Democratic in 1876, 1884, and 1892, and Republican again in 1880, 1888, 1896, 1900, 1904, and 1908. It was Democratic in 1912. The Governors, since its organization as a Territory, have been as follows:

TERRITORIAL

William H. Harrison	1800–11
John Gibson	1811–13
Thomas Posey	1813–16

STATE

Jonathan Jennings	Democrat-Republican	1816–22
William Hendricks	“ “	1822–25
James B. Ray	“ “	1825–31
Noah Noble	“ “	1831–37
David Wallace	Whig	1837–40
Samuel Bigger	“	1840–43
James Whitcomb	Democrat	1843–49
Joseph A. Wright	“	1849–57
Ashbel P. Willard	“	1857–61
Henry S. Lane	Republican	1861
Oliver P. Morton	“	1861–67
Conrad Baker	“	1867–73
Thomas A. Hendricks	Democrat	1873–77
James D. Williams	“	1877–81
Albert G. Porter	Republican	1881–85
Isaac P. Gray	Democrat	1885–89
Alvin P. Hovey	Republican	1889–91
Ira J. Chase	“	1891–93
Claude Matthews	Democrat	1893–97
James A. Mount	Republican	1897–1901
Winfield T. Durbin	“	1901–05
J. Frank Hanly	“	1905–09
Thomas R. Marshall	Democrat	1909–13
Samuel M. Ralston	“	1913–

Prior to 1908 laws were in existence placing definite restrictions on the licensing and conducting of saloons. In that year, at a special session, Governor Hanly obtained the passage of a county option law. The Democrats were victorious in the elections of that year, but failed in an attempt to have this law repealed, their object being the substitution of a local-option law. During the year 66 out of 92 counties voted no license. The election that year was hard fought, and though Taft was victorious by a plurality of 10,731 votes, a Democratic Governor and Legislature were elected. The vote was as follows:

PRESIDENT		GOVERNOR	
Taft, Rep.	348,993	Marshall, Dem.	348,493
Bryan, Dem.	338,262	Watson, Rep.	334,040
Debs, Soc.	13,476		

The Democratic Legislature resulted in the election, on Jan. 19, 1909, of B. F. Shively to the United States Senate. In 1910 Thomas Taggart, leader of the State Democratic organization, opposed John W. Kern, defeated candidate for Vice President in the past election, for nomination for the seat held by Senator Beveridge in the United States Senate. Though the majority of the delegates were pledged to Taggart, strong opposition arose, and Kern secured the nomination. The election of a Democratic Legislature insured his election on June 17, 1911. In January the Legislature repealed the county option law, substituting the township or ward as the unit of option. On February 26 the first election was held in 40 cities and townships under the new law. As a result, three cities—Martinsville, Connersville, and Wabash—changed from "dry" to "wet," and Crawfordsville, Tipton, Frankfort, Mitchell, and Bedford voted "dry." Governor Marshall's participation in the national campaign of 1912 as candidate for Vice President caused unusual interest. Ex-Senator Beveridge was a Progressive candidate for Governor, opposed to Winfield T. Durbin, Republican, and Samuel M. Ralston, Democrat. The result of the election follows:

PRESIDENT		GOVERNOR	
Wilson, Dem.	281,890	Ralston, Dem.	275,357
Roosevelt, Prog.	162,007	Beveridge, Prog.	166,124
Taft, Rep.	151,267	Durbin, Rep.	142,850
Debs, Soc.	36,931		

The Legislature was again Democratic. In the election of 1913, mostly for municipal offices, the Democrats swept the State. Indiana has 13 members in the House of Representatives. In November, 1914, Senator Shively was reëlected.

Bibliography. Foulke, *Life of Oliver P. Morton* (Indianapolis, 1899); *Indiana Historical Society Publications* (Indianapolis, 1900 et seq.); Dunn, *Indiana: A Redemption from Slavery* (Boston, 1905); Rawles, *Government of the People of Indiana* (New York, 1906). Consult: Brown, *Government of Indiana* (ib., 1912); Davison, *Government in Indiana* (ib., 1912); Aley and Story, *Story of Indiana and its People* (ib., 1913). Consult also reports of the State departments and statutes.

INDIANA. A romance by George Sand (1832), and the name of the heroine, a young Creole.

INDIANA ASBURY UNIVERSITY. See DE PAUW UNIVERSITY.

INDIAN AFFAIRS. The position of the Indians still under tribal organization within the limits of the United States is anomalous. Strictly speaking, they are not a part of the body politic, but are regarded as "domestic dependent nations" and are officially spoken of as the "wards" of the nation. Their right to regulate their domestic affairs is conceded, but this right has been restricted by acts of Congress enlarging the jurisdiction of the Federal courts in respect to crimes committed by Indians. The Cherokees, Chickasaws, Choctaws, Creeks, and Seminoles, formerly known as the Five Civilized Tribes, developed well-ordered governments. Each nation had its own popularly elected executive, legislature, and judiciary. They were permitted to enact such laws for the regulation of their internal affairs as did not conflict with the Constitution and laws of the United States, while the decisions of their courts received the same recognition as to faith and credit as did those of the Territories. The title to land occupied by them was vested, not in the individual members of the tribe, but in the nation as a whole, and it could be alienated only with the consent of the United States government. The Supreme Court has held that an Indian born within the jurisdiction of a tribe can become a citizen of the United States only by naturalization. By an Act of Congress, however, passed in 1887, it was provided that Indians residing on lands allotted to them in severalty should be considered as citizens of the United States without the formality of naturalization. The immediate effect of the Act of 1887 was to confer citizenship upon 10,122 Indians to whom allotments had already been made under special laws and treaties. Every year from 1000 to 2000 Indians signify their desire of becoming citizens by taking allotments. By Act of 1911 the property of the Five Civilized Tribes was allotted in severalty. The work of distributing the lands and of selling unallotted lands for the benefit of the members of the Cherokee nation was practically completed in 1914, and the tribe had ceased to exist as a political entity. In 1914 it was estimated that about two-fifths of the Indians of the United States were still living in tribal relations with property unallotted. The Constitution confers upon Congress the power to regulate commerce with the Indian tribes, and until the year 1871 the common method of dealing with them was by treaty through the agency of special commissioners. In that year, however, an Act of Congress abolished this practice and placed under the immediate control of Congress all commercial or diplomatic intercourse with the Indians.

From an early period it has been the practice of the government to conclude treaties with the Indians for the extinction of their possessory right to the lands occupied by them and for their removal to certain territories, known as reservations, specially set apart for their occupation. Whenever the United States sets apart an Indian reservation, whether within the territorial limits of a State or not, it has full authority to protect the Indians in their persons and property and to provide for the punishment of all offenses committed within the reservation. An Indian reservation lying within the limits of a State is, however, subject to its jurisdiction also except so far as concerns the government and protection of the Indians themselves, unless otherwise provided by treaty with the Indians. While all territory officially known as "Indian country" is subject to the jurisdiction of the United States, and while it belongs to Congress to enact laws for the regulation of intercourse of Indians with one another and with citizens of the United States, it is the policy of the government to leave to the Indians the regulation of their own domestic concerns as far as practicable. By acts of 1885 and 1890 Congress curtailed the jurisdiction of the Indian tribal courts. By the Act of 1885 the authority to administer their own criminal laws among themselves, so far as certain enumerated crimes committed by Indians are concerned, was withdrawn and vested in Territorial courts.

It is the policy of the United States to exercise a general supervision over the affairs of the Indians and to protect them from the encroachments of unscrupulous whites, as well as from the evil consequences of their own ignorance and improvidence. Many statutes have been passed by Congress to prohibit hunting on their lands, to prevent cutting timber from their lands or pasturing stock on them, to prevent the sale of intoxicating liquors to them, etc. Citizens of the United States of good moral character are permitted to trade with Indian tribes, upon giving bonds. The power of appointing and licensing Indian traders, as well as prescribing rules concerning the kind, quantity, and prices of goods to be sold, belongs to the United States Commissioner of Indian Affairs. This officer is further empowered to remove from Indian reservations all persons found there contrary to law or whose presence is deemed detrimental to the peace and good order of the Indians.

Until 1832 the supervision of Indian affairs was intrusted to a bureau in the War Department. In that year Congress authorized the President to appoint a commissioner charged with general superintendence of Indian affairs. He has the direction of eight inspectors and a large number of superintendents, agents, teachers, mechanics, etc. Since 1849 the business of Indian affairs has constituted a bureau in the Department of the Interior. The most numerous officials in the Indian service are the agents, appointed by the President for a term of four years, who are required to give bonds. Their duties are to superintend the intercourse among Indians within their respective agencies and to execute the orders of the commissioner. An important feature of the Indian service is the educational work. The President is empowered to employ capable persons to instruct the Indians in agriculture and to teach their children reading, writing, and arithmetic. By an Act of 1882 he was authorized to appoint an inspector of Indian schools. The schools under government control are the nonreservation training schools and the reservation boarding and day schools. Besides these there are contract schools under the supervision of religious associations which receive government aid. By an Act of Congress passed in 1890, provision was made for field matrons who organize sewing schools, weekly clubs, and Sunday schools among the Indians. In 1913 there were nearly 40,000 pupils in government Indian schools and between 7000 and 8000 in other schools receiving government aid. The policy now being pursued by the government will result in the incorporation of all Indians in the body politic as citizens, and with it the Indian reservations will disappear, the individuality of the Indian will be recognized, and the paternal care and control now exercised by the United States will cease.

Bibliography. Indian Rights Association, *Annual Reports* (Philadelphia, 1883–); Weil, *Legal Status of the Indian* (New York, 1888); F. S. Dellenbaugh, *North Americans of Yesterday* (ib., 1901); C. J. Kappler, *Indian Affairs, Laws, and Treaties* (2d ed., 2 vols., Washington, 1904); H. B. Carrington, *Indian Question* (Hyde Park, Mass., 1909); F. E. Leupp, *The Indian and his Problem* (New York, 1910).

IN'DIANAP'OLIS. The capital and largest city of Indiana, and the county seat of Marion County, situated in the centre of the State, on the west fork of White River, 183 miles southeast of Chicago and 111 miles northwest of Cincinnati (Map: Indiana, C 3). It lies 700 feet above sea level, is a broad rolling plain, rich in agricultural and mineral resources and in forest trees of exceptional beauty. Large oil fields are in the vicinity; also coal lands 6500 square miles in extent, and deposits of building stone, marl, and other minerals. Wholly an inland city, Indianapolis relies on railways for its commerce, and its location within 50 miles of the centre of population of the United States for the past three decades has made it a great railway centre. Here terminate nine divisions of the Big Four system, six divisions of the Pennsylvania Railroad, one division of the Illinois Central System, the Lake Erie and Western, Chicago, Indianapolis, and Louisville, and the Cincinnati, Hamilton, and Dayton, besides 12 electric systems. The railways bring their passenger trains into a union station, and the interurban lines have erected a large union terminal station costing over $1,000,000. Freight passing Indianapolis is carried over a belt railway 15½ miles long, on which are situated 125 industrial establishments, including the Union Stock Yards. The street-railway system represents an outlay of about $9,000,000, with 144 miles of tracks, and a park (Fairview) containing 200 acres.

The city has broad streets, ranging from 40 to 120 feet in width and shaded mainly by maples and elms and crossing at right angles. In the heart of the city is a circular plaza, once known as the Governor's Circle, and now called Monument Place, from which radiate four avenues to the four corners of the city. The park system comprises 1662 acres and includes Riverside, extending for 5 miles along both sides of White River, Garfield, Brookside, Military, St. Clair, University parks, and Ellenberger Woods. The most notable structure in Indianapolis is the Soldiers' and Sailors' Monument, designed by Bruno Schmitz, of Berlin. It was erected by the State to commemorate the part Indiana bore in the wars of the Union. The monument is a shaft of stone and bronze, 285 feet in height, surmounted by a figure of Indiana. About the base are allegorical groups in stone representing war and peace, and beneath these are two great fountains. Near the monument are four subsidiary bronze statues of Gen. George Rogers Clark, Gen. William Henry Harrison, Gov. James Whitcomb, and Oliver Perry Morton. There are also statues of Schuyler Colfax, Oliver P. Morton, and a bust of Robert Dale Owen, in University Park, and, in the Capitol grounds, of Thomas A. Hendricks. In the County Court House grounds there is a statue of Gen. Henry W. Lawton. The buildings most worthy of note are the Capitol, 492 by 185 feet, built of Indiana limestone at a cost of $2,000,000; the United States Court House and Post Office, which cost $2,500,000; Christ Church; Columbia Club; the Propylæum, a woman's building devoted to literary and social purposes; the Public Library, with 100,000 volumes; and the John Herron Art Institute. There are many large business blocks and hotels, e.g., the Merchants National Bank Building, the Odd Fellows', the Masonic Temple, the Fletcher Savings and Trust Company, the Terminal Station, the Hume mansion, the Claypool Hotel, and the Severice Hotel. The Benjamin Harrison Army Post is north of the city. Six of the city's bridges possess more than ordinary beauty; they span Fall Creek at Illinois Street, Meridian Street, Central Avenue, College Avenue, and Thirtieth Street, and White River at Thirtieth Street. The public-school system includes the common schools with 65 buildings, three high schools, and a normal training school. The medical college in the city is a department of Indiana University. The Long Hospital is a part of this. In addition there are the Indiana Dental College, the Indiana Law School, Butler College (a high-grade standard institution), Indian Central University (under control of the United Brethren church), and the Art School connected with the Herron Art Museum.

The State has placed some of its institutions in Indianapolis. There are, e.g., the Indiana Prison for Women, with a correction department, the Central Hospital for the Insane, the State School for the Deaf, and the State School for the Blind. The hospitals are the Deaconess, Methodist, St. Vincent, City Hospital, and many private institutions.

All religious denominations are well represented by 257 organizations with buildings. The Christian Associations have three centres—the Young Men's Christian Association, the Young Women's Christian Association, and the Colored Young Men's Christian Association.

There are many clubs, literary, social, and political. Perhaps the best known are the Woman's Club, the Indianapolis Literary Club, the Männerchor and Deutsche Haus (both with excellent buildings), the Marion, Columbia, and Indiana Democratic clubs. The best-known theatres are the Murat and English's.

The city government consists of a mayor, a council of nine members (elected at large), a city clerk, and a police judge, all elected by the people every four years. The members of the various boards are appointed by the mayor: board of safety and board of public works of three members each and board of health and park board of four each. The mayor also appoints the corporation counsel, city attorney, and city controller. By the charter the boards name their subordinates. The school corporation is independent of the city corporation and is composed of five members chosen by the people and serving four years. This school board chooses a school superintendent, business director, and city librarian.

Expenditures for 1912 are given as follows: finance, $206,366.20; public works, $1,199,510.16; public safety, $874,551.63; health and charities, $181,263.58; legal, $16,667.71—a total of $2,478,359.28. The park board expenditure should be added to this, $562,716.99. The disbursement for school purposes amounted to $1,519,198.74. The assessed valuation is $218,029,220; the bonded indebtedness, $3,403,300.

Pop., 1850, 8091; 1860, 18,611; 1870, 48,244; 1880, 75,056; 1890, 105,436; 1900, 169,164; 1910, 233,650. The population in 1910 included 19,767 foreign born and 21,816 negroes. United States estimate for 1914, 259,413.

Indianapolis is a port of entry and a point for the receipt and distribution of foreign as well as domestic commerce. Its chief articles of trade are grain, live stock, meats, and the output of its extensive manufactories—milling machinery, engines, drugs, vehicles, furniture, bags, woolens, and starch.

Settled in 1819, Indianapolis received its name in 1821 and became the capital on Jan. 1, 1825, the seat of government being removed from Corydon. The opening of the first railroad in the State from Madison, on the Ohio River, occurred on Oct. 1, 1847, and gave the little town its first impetus. The growth since 1889, when the introduction of natural gas revolutionized manufacture in Indiana, has been remarkable. Consult: *Indiana Gazetteer* (Indianapolis, 1849); Nowland, *Early Reminiscences of Indianapolis* (ib., 1870); Sulgrove, *History of Indianapolis and Marion County* (Philadelphia, 1884); Holloway, *Indianapolis* (1870); Hyman, *Handbook of Indianapolis* (1909); Dunn, *Greater Indianapolis: The History, the Industries, the Institutions, and the People of a City of Homes* (1910).

INDIAN ARCHIPELAGO, ăr'kĭ-pĕl'ȧ-gō. See MALAY ARCHIPELAGO.

INDIAN ARMY. See UNITED KINGDOM, *Army;* EAST INDIA ARMY.

INDIAN ART. The chief art of India historically is its architecture, though the decorative arts, sculpture, and mural painting, together with a highly developed art of designing in metal work, jewelry, miniature and other painting, pottery, and textile fabrics, have a peculiar value and interest of their own.

ARCHITECTURE

In the antiquity of its architectural monuments India cannot compare with a number of ancient nations, because the earliest constructions were made of wood and clay. In the remote period of Vedic times (see VEDA) the houses seem to have been built almost entirely of wood, as they still were as late as the end of the fourth century B.C., when Megasthenes was the Greek Ambassador of King Seleucus (c.300 B.C.) to the Mauryan court at Pataliputra; for Megasthenes then spoke with admiration of the vast wooden halls of the Indian King, with their richly adorned columns, embellished with gold and silver. From allusions in the ancient hymns of the *Rig-Veda*, it seems clear that the builder's art, besides erecting buildings, extended also to the construction of fortified inclosures, of use in war, consisting of earthworks strengthened by a stockade or occasionally reënforced by stone. Yet none of these early structures have survived, and it is doubtful if traces of this application of the builder's skill, prior to the sixth century B.C., can be found. Stone and brick came into general use in the third century B.C., in the time of Asoka (c.250 B.C.), and here architectural history begins. It falls into three main religious divisions: (1) Buddhist (300 B.C. to c.700 A.D.), in which period architecture commences to decline in the fifth century; (2) Jaina and Brahman, existing side by side in harmony with Buddhism in certain regions, from 600 to 1200 A.D., and then dividing the field with the (3) Mohammedan style, which began with the Afghan invasion in the early eleventh century. Since the English conquest Indian architecture has lost much of its vitality. There is no unity in India under these periods or styles. Local differences are enormous. The two main geographical divisions are north India, which was the earlier to develop, and south India. At the same time Indian art as a whole has certain common characteristics throughout its various local schools. It far excels in architecture at least the art of China and Japan, and it governs the art of neighboring regions like Tibet, Cambodia, Burma, and Siam, and islands like Java and Ceylon, which owe their civilization to India.

In seeking to explain the origin of Indian architecture, some traces of Greek influence have been found in the north, filtering through the Greek Kingdom of Bactriana, and visible in early monuments of Kabul and Kashmir, in the Ghandhara monasteries of Jamalgiri and Takht-i-Bahi, and in India proper at the Amravati Stupa; but the strongest early influence appears to have been that of Persia, which was flourishing when Indian art commenced. Yet whatever suggestions were received, they serve but to bring out the originality of Indian art, which stands at the antipodes of Greece in its exaggeration of forms, its multiplication of details, its love of complicated and confused lines, its lofty disregard of utilitarian considerations and of structural expression. At the beginning comparative simplicity reigned, and it was not until long after the Christian era that the richness of design was reached which remained characteristic. This was partly due to the use of brick, instead of stone or marble, in nearly all open-air structures before the tenth century A.D., which diminished the opportunity for elaborate surface ornamentation. To classify Indian architecture, to divide it into well-marked styles and periods, is impossible, because of the scarcity of the historical records, and the confusion and overlapping of races (Aryan, Dravidian, and Mohammedan) and the different religious needs. To a certain extent the dominance first of Buddhism and later of Jainism suggests natural divisions. But Buddhism has wholly disappeared as an architectural factor; while, since the tenth century the Jaina and Brahman faiths have existed side by side and the Moslem faith in addition since the twelfth. On the whole, as indicated above, Fergusson's system serves as well as any, and, slightly modified in nomenclature, will be followed here. Leaving the Moslem architecture to be treated under the article MOHAMMEDAN ART (q.v.), we assume five style divisions: the Buddhist, the Jaina, the Brahman in northern, central, and southern India. Thus the distinctions of style are partly chronological, partly religious, partly geographical.

Buddhist Period. Buddhism and Jainism (q.v.) appear to have arisen nearly at the same time (in the first half of the sixth century B.C.), but all the early monuments of India down to 600 A.D. belong to the Buddhist faith. They comprise *chaityas*, or chapels, *vihāras*, or monasteries, and *stūpas*, or shrines, usually of circular plan. The chaityas and viharas were almost all excavated in the rock between 250 B.C. and 600 A.D., the majority of them in the Bombay Presidency. The temples are large oblong halls, divided into nave and aisles by two rows of heavy columns, approached by a vestibule with an arched façade, richly carved, and have at the apsidal end a *dagoba* (dāgaba), or shrine, or sometimes a statue of Buddha. The earliest—at Bhaja—are the smallest and simplest. At Karli (78 B.C.) the nave has a stilted tunnel vault, and the heavy columns are octagonal, with elephant capitals, and the interior somewhat resembles a dark, tunnel-vaulted French-Romanesque church. Even more impressive are the largest cave temples at Ajanta, Nasik, and Ellora (q.v.), where temples and monasteries are multiplied side by side in the face of the rock. The sculptures and frescoes at Ajanta are of special interest. The monasteries, often grouped about these temples, consist each of from one to four courts or central halls surrounded by cells, all cut out of the rock. One of those at Ajanta has a court 65 feet square, supported by 20 pillars; the court of the great vihara at Bagh is 96 feet square, with 36 columns, and is preceded by a rock-cut colonnaded porch, 200 feet long. None of the early wooden viharas has survived. The third class (the *stūpas*, or *topes*) are great brick memorial mounds of circular form. They are of conical or of domical outline, surmounted by a little chapel or shrine, and surrounded by a marble rail or balustrade entered by four gates. They are found in groups, the most important at Bhilsa, Manikyala, and Amravati in India, and in Ceylon. The Sanchi tope is in splendid preservation and is remarkable for its elaborate and beautiful figured sculptures. The only structural (as distinguished from rock-hewn) monument of the Buddhist period, Buddh Gaya, or Boddhi Gaya (c.100 B.C.), is in the form of a tower-like edifice in many stepped stories, upon a square base, at the corners of which rise four small pyramids. It is 52 meters high, and, like all the other early monuments, it is built of brick.

Jaina Style. The existence of a distinct Jaina style has been disputed by some authorities, like Vincent Smith and Coomaraswamy, who hold that the so-called Jaina style of architecture, as in Gujarat and elsewhere in the west, is not especially Jainistic, but is a local style, characterized by a free use of columns, richly carved, and other particular features. On the other hand, certain specialists, like Fergusson, claim that the Jaina temples previous to 1000 A.D. are easily distinguished from the Brahman, both by their plans and their details. While Jainism arose contemporaneously with Buddhism, it has left us few monuments earlier than 900 A.D., and its architecture ceased to be distinctive within a few centuries thereafter. The Jaina monuments, with the exception of a few caves, indistinguishable from the Buddhist caves, at Badami, Ellora, etc., are structural. The temples are elaborate edifices, set in courts surrounded by cells containing seated figures of Tirthakaras, or deified saints. The sanctuary is preceded by a *mantapam*, or porch, and surmounted by a lofty *śikhra*, or tower, its other portions being covered by domes built in horizontal courses. The architectural details of sculpture and carving are extraordinarily rich and intricate, and stone brackets, obviously derived from wooden prototypes, are notable features. The earliest and perhaps finest group is on Mount Abu (1032); others are at Girnar, Somnath, Gwalior, etc. In many cases, as at Khajuraho, the later Jaina temples are identical in style with the Brahman; in others they resemble the Moslem mosques in detail, though not in plan. Towers of Victory at Chittur are striking monuments of Jaina design. It is in the Jaina architecture that one first notes the tendency to stratification and endless multiplication of breaks, both vertical and horizontal, in exterior design—characteristics which became almost universal in the Brahman styles and to some extent in the Indo-Moslem. See JAINISM.

Brahman Styles. The Brahman, or Hindu, architecture comprises three quite distinct styles: the northern, the central, or Chalukyan, and the southern, or Dravidian. The monuments of the northern style are hardly to be distinguished from the Jaina temples, except by the absence of courts with Tirthakara cells and of bracketed domes. As in the Jaina temples, their most conspicuous feature is a *vimana*, or *śikhara*, topped with the *amalaka*, or melon-shaped ornament. They date chiefly between 600 and 1200 A.D. and are by some authorities subdivided into three groups: (1) in the northeast, Orissa; (2) in Bundelkhand and Rajputana; (3) in Gujarat.

The earliest monuments of the style are in Orissa, where it flourished for 700 or 800 years. The numerous temples at Bhuvaneswar are its highest expression. The tower of the larger temple (c.600 A.D.) is 180 feet high, and near it is the Black Pagoda, whose superb decoration marks a new era. But in general these temples are small. Much later (c.1200 A.D.) is the temple of Jaganath (Juggernaut), at Puri, which shows the decadence of this style.

Quite distinct is the contemporary school of Rajputana, whose ruined city, Khajuraho (Khajrao), with its miles of ancient buildings, is unsurpassed in India. Among its 40 temples, belonging to the Jaina religion and to both branches of the Brahman—the Vaishnavite and Shaivite—there is little or no distinction of style. Their plan is elaborated by the projection of wings and porches, and the elevation is enriched by the grouping of many subordinate spires around the central vimana. Each temple stands on a stone platform and ordinarily measures about 40 meters in height and 35 meters in width. Like the preceding, the remarkable temples at Gwalior date from the tenth to the eleventh century. Decorative and figured sculpture now spreads luxuriantly over every inch of surface. The interiors are small and dark, the supports heavy and broken, and the decoration of the pyramidal exterior by innumerable small repetitions of its own form has become the most effective part of the style. The famed Khandarya Mahadeo (c.1000 A.D.) is the most remarkable of this extraordinary group. At Brindaban is a fine ruined temple; at Kantannagar a very late temple of terra cotta in a mixture of the Brahman and Moslem styles (1704).

Chalukyan. Passing to the centre of India, we find few but important works. The temples of Ellora (q.v.), famous the world over, exemplify the fusion of Buddhism and Brahmanism. There are about 30 excavated in the rock over a distance of two kilometers. The earliest and greatest temple is that of Visvakarma, 26 × 13 × 10 meters, divided into three aisles by 38 pillars. The temple of Indra is remarkably rich decoratively, but less so than the Kailasa (see ELLORA), which is a free-standing monolithic temple, cut out of a single mass of rock, and one of the most fantastic and brilliant creations of Indian art. Another group of subterranean temples is on the island of Elephanta (q.v.), dating approximately from the eighth century and easily visited from Bombay. The absorption of Buddhism by Brahmanism, seen during its earlier stages at Ellora, is almost complete at Elephanta, as shown by the sculptures and ritual. Some of the colossal statues are very impressive. These rock-cut temples, however, do not exhibit the characteristics of the structural temples of the so-called Chalukyan style, so named from the dynasty to whose reigns they belong. This style prevails in various centres between the Nerbudda and Kistna rivers and in the Province of Mysore to the southwest. The Chalukyan temples have shrines star-shaped in plan, and the vimana is a low pyramidal mass, not a lofty sikhra. All the details are extraordinarily rich. The temples stand on raised platforms, and their lower portions are deeply cut into stratifications, with successive bands of sculptured animals and carved ornament. Pierced stone slabs fill some of the intercolumniations. Some of the temples have double shrines, and a few are even triple. The earliest, dating from the tenth century, is at Buchhanapally, near Hyderabad; the most magnificent is the Great Temple at Halebid in Mysore; other examples are at Bailur, Hanamkonda, and Somnathpur. At Norangal is a remarkable gate, the Kurti Stambha.

Dravidian. In the south Buddhism never had a strong hold, though there are some subterranean rock-cut temples, the earliest monuments in the region. There are two groups, at

Mahabalipur and at Badami. At the former is a most interesting series of small monolithic temples in the open, similar to the Kailasa at Ellora, and apparently the prototypes of the later pagodas of the south. Both groups are thought to belong to the sixth century A.D. and are among the earliest-known Brahman temples.

Coming now to the distinctively Brahman monuments of the style which Fergusson has called the Dravidian, we encounter a gap of about four centuries in the art of the south, until we reach the earliest pagodas, or *gopurams*, which are characteristic of this region. These gopurams are rectangular truncated pyramids in several stories, forming towers or pylons over the principal gateways of the temples; the largest is about 50 meters high and has seven stories. The temples are not single structures, but aggregations of courts, pillared halls (choultries), porches (*mantapams* or *mandapas*), and corridors, the whole covering a vast area surrounded by walls pierced by gopuram gateways. As singular as their vast extent and the richness of their details is the lack of interior loftiness; the height of halls and corridors being usually between 10 and 30 feet. The plan of the Great Temple at Chillambaram is a rectangle of 500 and 400 meters. There is a large sacred pond (100 × 60 meters), and the main temple has 1000 columns and measures 103 × 60 × 13 meters. In contrast with the buildings of the north is the enormous horizontal scale of such monuments; the choultry of Tiramalla Nayak at Madura measures 100 × 32 meters; the corridors at Ramisseram are 220 meters long. At Tanjore (eleventh century) are a great gopuram tower in 15 stories directly over the sanctuary, the mantapam (or temple) of the sacred bull, an open colonnaded shrine in three aisles, and in one of the two courts the small but exquisite shrine of Soabramanya, with details curiously suggestive of the Renaissance styles. Another group of extremely sacred pagodas—inaccessible to Europeans—is at Tripatty, still another at Conjecveram.

But the greatest group in the entire south is at Vijanagara (q.v.), which has remained a deserted city since 1565. Its monuments are comparatively late, dating mostly from the fifteenth and sixteenth centuries, and they belong to the culminating period of art in this region. The great pagoda of Liva and the temple of Vitoba illustrate the grandiose and monumental character of the buildings, although their taste is less pure than that of previous centuries. Still later is the great pagoda, or gopuram, at Madura, an immense and imposing composition (seventeenth century). One of the best portions is the present Bazar, or Puthu Mantapam, 100 × 30 meters, with a roof supported by an imposing avenue of 128 piers, mostly in the form of realistic monsters and divinities, in a style much used in the south, but never with such richness and lifelike detail as in this centre of southern architectural remains.

In the matter of size and imposing composition nothing equals the great pagoda of Srirangam, one of the most gigantic edifices in the world and situated in the Trichinopoly district. Here successive rulers added to the original inclosure until there are seven concentric rectangles, the outer one measuring 880 × 760 meters. Aside from its size, there is little merit in the pile, as it is bare or poor in detail and design.

Buddhist Style in Neighboring Lands. Passing now to outlying parts of India and neighboring provinces, we find in the sequestered Province of Nepal, between India and Tibet, an archaic style that explains some of the origins of Indian art and illustrates a connection with China. A first type of monument is that of the large circular domical stupas of earth and brick, set upon a simple plinth without a balustrade and dedicated to Buddha. These are the earliest (Svayambunath, Buddhnath). A second and far commoner type is that of the pagoda-like temples in brick and wood formed of several stories of superposed roofs, each one in retreat and raised at the corners, in perfect analogy to Chinese monuments (Bhatgaon, Patan). A third type is that of stone temples of quite a different style and of admirable design. Chronologically all these buildings are late—not more than two to five centuries old—but they represent earlier types in a region that remained in a prehistoric undeveloped condition. So the class of pagoda-like temples of brick and stone is of extreme interest. It is the same in Burma, where many monasteries were built of wood or brick.

Of even greater architectural interest is Cambodia, whose ruined cities have only recently been explored, with buildings dating between 950 and 1350. Here brick construction. and stonework are very successfully combined. The ancient capital, Angkor, has a superb series of temples, particularly that of Nakhon Wat. Its inclosure measures about a mile each way, and the buildings are well composed. As in southern India, there is a large pond surrounded by courts, corridors, and temples. Grouped pyramids are used, in stories of decreasing size. Monumental staircases most effectively connect the buildings. The sculpture is exceedingly rich, but is symmetrically arranged, and the lines are not broken up, but compose simply in a manner quite un-Indian. The Renaissance character of some of the ornamentation is startling; it is undoubtedly a true Indian renaissance from traditions of classic Hindu influences. In quality of detail the Angkor buildings are unsurpassed in India.

In Java, also, there is an interesting offshoot of Buddhist art. Its chef-d'œuvre is the famous Boro Buddor (q.v.), built in the seventh century A.D., a perfect epitome of Buddhist art before its fall. It is a stupa or dagoba in seven stories, approached by five processional paths, along which are 72 small domes surmounting separate dagobas which surround the central one. Nothing like this remains in northern India among Buddhist monuments, so that for comparison one must go to Gandhara, in the northwest, to Jamalgiri and Takht-i-Bahi, which are its prototypes.

Still another region abounding in archæological remains is the island of Ceylon, which also contains a mass of Buddhist monuments. The ancient capital, Anuradhapura, is unique in having a series of Buddhist monuments built throughout nearly a millennium, and long after Brahmanism had displaced Buddhism on the mainland. There remain seven separate stupas, with processional paths, as in Java. Two of these stupas have three rows of high columns surrounding the central mound, monoliths about 26 feet high, suggesting the columns of Persepolis. There is but little sculpture used in the decoration, and in some of it the lines of hieratic animals give additional points of resemblance to western Asia.

Mohammedan Style. The superb Mohammedan architecture of India is treated under MOHAMMEDAN ART. In some cases, as at Ahmadabad, the fusion with pure Indian art is so thorough as to leave only part of the credit to imported ideas from Persia and Bagdad. But at Agra, Delhi, and Bijapur the style is fundamentally foreign.

DECORATIVE ARTS

General Character. The religious character of Indian art is quite as prominent in other branches as it is in architecture. A knowledge of the intricacies of the Hindu pantheon (see Illustration under INDIA) is a necessary prerequisite to the study of the sculpture and painting, the pottery and even the lacquers, bronzes, and goldsmith work. There is little æsthetic value in most of the mediæval and modern representations of the human figure as such in India; they interest in the mass, as decoration, and because of their subject, as illustrative material for the study of Indian thought. Indian art is essentially symbolic and religiously idealistic. It employs form only as a vehicle for ideas. The Hindu ideal is the very opposite of the Greek inasmuch as form is made light of and moral elevation and meditation are more valued than mere beauty and force. Indian art is thus much nearer to the Byzantine and Gothic than to the Greek. While it is true that many Indian mediæval and modern productions are grotesque or hideous because of a symbolism which disregards æsthetic considerations, the fact must not be lost sight of that for 2000 years "during the so-called dark ages Indian and Ceylonese painting attained a degree of proficiency not matched in Europe before the fourteenth or fifteenth centuries" (V. Smith). The endless repetition of the same theme in the same monument is characteristic of its symbolic use, as it is, indeed, of the Oriental spirit. This impersonal character has favored the extraordinary tenacity of tradition and continuity of style still to be observed in the various provinces. This has been made possible by the hereditary nature and continuous life and organization of the different crafts, not only in the guilds of the cities, but especially in the groups of artisans which, organized as guilds, have for some 3000 years formed an integral part of the village communities of India, supplying its inhabitants by perpetual contract. The sumptuary arts fostered by the aristocracy naturally flourished in the cities and not in these village communities. Despite their adherence to tradition Indian workmen are capable of imitating with skill and success. Although originality vanished centuries ago, no fundamental damage had been inflicted on Indian arts until under British rule the incongruous architecture of Europe, and the degrading methods of machine manufactures came into fashion in place of the native methods of hand work. This tenacity makes it possible to study some of the methods of antique art in modern India, because the continuous overland trade during antiquity and the Middle Ages kept India in constant relations with Persia, Babylonia, and Assyria, Egypt, and the late Hellenic states after Alexander's time, and later with the Mohammedan powers. The stepped temples of Babylonia, the filigree gold jewelry of Etruria and Greece, the enameled tiles of Persia, the products of the looms of Mesopotamia, and, later, the arts of the Mohammedans of Egypt, Syria, and Persia, were all paralleled or echoed in India with greater or less purity. Yet there was always enough of a transformation to give an aspect of Hindu unity to whatever was borrowed. Indian art has always been full of a character of its own. Its greatest successes have been in its decorative work, both on a small scale and in masses, and in the imposing compositions of its architecture. Its failures are due to a poor sense of form both in line and composition.

Sculpture. The early Indian sculpture combines naturalistic modeling with ideal dignity of figure. It does not know the monstrous and grotesque which characterize the mediæval period of architecture. The earliest glyptic monuments are the famous pillar edicts of Asoka (q.v.) and the encircling marble rails belonging to the Sunga dynasty and found at Beshagar, Bharhut, Buddh Gaya, and Sanchi. The sculpture of the Kushan dynasty is not properly Indian but Græco-Roman. It reached its acme in the first two centuries of the Christian era in the remarkable Buddhist reliefs at Gandhara; they are carved on blue clay slate and exhibit traces of color and gilding. Other centres of Greek art are Mathura (Muttra), Sarnath (near Benares), and Amravati (in Madras). This foreign art does not seem to have exercised a lasting influence on the development of Indian sculpture. The monuments of the Gupta dynasty (inaugurated 320 A.D.) are thoroughly Indian. Excellent examples of Gupta workmanship are found at Ajanta, Bagh, Aurangabad, and other places. Neither this sculpture nor that of the succeeding centuries up to the tenth is marred by the introduction of the monstrous as decorative element. Southern sculpture, especially "remarkable for its enormous quantity, fantastic character, often degenerating into the grotesque, and marvelous elaboration, rarely, if ever, exhibits the higher qualities of art" (V. Smith). The three centuries before and the nine after the Christian era witnessed the development, under Buddhist influence, of the most artistic schools of sculpture that India ever saw. In certain parts of the north and northwest, especially, there are traces of Greek and Persian influences, as in several monuments of the region of Peshawar. They frequently show evidence of a realism which was lost later when the figure of Buddha became an object of worship and crowded out the other representations of the male figure. The Buddhist style was continued in Ceylon after it had decayed on the mainland, as is shown at Anuradhapura. The Ceylon sculptures are inferior to those of the mainland. A high degree of excellence is shown by the Boro Buddor (Java) sculptures of about the eighth century A.D., which are very remarkable for their execution as well as their elegant simplicity, directness, and sincerity. Most of these sculptures can be studied in the South Kensington Museum (London) or the Indian Museum (Calcutta) and in the British Museum and the Madras Museum.

The subordination of sculpture to architecture is evident even at this early period: the human figure, though used in colossal size in statues and high reliefs, especially in representations of Buddha, is usually in rather minute proportions and in confused and intricate compositions. Line upon line of reliefs are superposed, in which architectural detail and decorative design play an important part. The rock-cut figures of the caves are hardly as delicate as the earlier sculptures of the rails or the later work on the open-air temples. The almost classic style of Muttra, of which echoes even survive at Amravati, is gradually replaced by one given to grotesque and exaggerated forms: the female figure especially is treated with undue emphasis, the breasts and hips being exaggerated and the arms disproportionately long. Much of the figure is, moreover, hidden by bracelets and other ornaments. Indian sculpture and painting seem to have been checked in their development by Buddhist asceticism. With the worship of Buddha's figure the ideal artistic type came to be the Yogi, an emaciated ascetic sitting cross-legged on a mat and lost in profound and pious meditation. This ideal the Hindus admirably succeeded in embodying in their art, and from this Buddhist point of view the material shortcomings of Buddha's representations—stereotypy, stiffness of the folds, schematic outline, want of anatomical details and of proportion—matter little as long as the transcendent religious idea is clear. Mahayana (q.v.) Buddhism merely multiplied these representations and combined them with symbolic elements which recall the exuberant fancy of the Puranas.

The relative scarcity of portraiture, the prevalence of wood-carving technique in sculpture, and the subordination of this art to architecture are due to its close connection with religious worship. Where religious preoccupation is absent, as in the representation of animals, realism asserts itself, and, especially in the minor decorative pieces, grace, force, and a limited amount of realism are met with. In the words of Mr. Percy Brown, "the very highest form of fine art in India is to be met with in the terra-cotta statuettes made at Lucknow," which are thoroughly realistic. These works of art are the strongest argument in favor of those who, like Havell, hold that the deficiency of religious art is not due to a lack of the æsthetic sense among the Hindus, but to a voluntary renunciation of beauty of form.

The Jaina period of the eleventh century, typified in the temples at Gwalior, Mount Abu, and Khajuraho, shows the existence of a style of exquisite delicacy and profuse richness. Every part of the surface of the temples at Mount Abu, both within and without, is carved, and the later style of Hindu sculptures finds here its prototype. Horizontal lines are emphasized: decorative design is given more importance than purely figured sculpture. Unfortunately the exaggerated deference to ritualistic prescriptions left no room to the artists' fancy. The Digambara sect makes use of the nude. Then and even earlier the art of sculpture received great development in outlying regions, in Kashmir, Tibet, and the French sphere of influence. There probably never existed a style of art in which sculptured ornament was so profuse as in the art of India and its neighbors. A second decadence came with the Mohammedan conquest: decorative design still flourished, but the Moslem dislike for the portrayal of the figure had its effect. Hindu traditions, however, were stronger than the Mohammedan belief: the recent sculpture of Delhi, Bombay, and Madras is directly derived from the eleventh-century style through intermediary stages. Martand and Avantipur in Kashmir, Madura, Ellora, Puri, and Khajuraho contain the foremost works of the old Hindu school. Vincent Smith's *History of Fine Art in India* gives a good classification of the sculptures. The three divisions of the Brahman style—Dravidian, Chalukyan, and northern Brahman—all afforded great scope for sculpture by the elaborate plans and colossal proportions of their sacred buildings. The most extensive and magnificent sculptured effects in the Dravidian style are found at the temple of Rameswaram, in the Chalukyan style (with great prevalence of animal and bird friezes) at that of Halebid, in the northern Brahman (Hindu) at Bhuvaneshwar.

The lack of æsthetic qualities in composition and form, which prevented monumental sculpture from reaching a high level of achievement, was not noticeable in the smaller branches of sculpture, such as carving in wood, marble, soapstone, and ivory, metal work, clay figurines, as well as inlaying and enameling. The naturalism and exquisite detail here appear to advantage. Work in black wood, ebony, and sandalwood is still carried on in many villages, for small objects, and in teakwood for the details of house decoration. Carved ivory is as popular as in China and Japan, both for statuettes and for reliefs of religious and genre scenes, hunts, animals, and birds.

Indian workmen are very adept at incrustations of varied materials—metal, ivory, ebony, etc.—on all sorts of objects. The fabrication of furniture is rather an industry than an art, and is chiefly produced for exportation, Hindu houses being, as a rule, furnished only with beds and trunks, as chairs and tables are for the use of strangers and found only in the reception rooms. The Bombay furniture with its closely carved surface is perhaps the best known. Mughal influence is visible in the decoration of doors and in the woodwork of perforated windows, which are often very artistic.

Painting. There is not the same continuity in the use of painting as in the other larger arts. The oldest example of painting was found in the Jogimira cave of Ramgarh Hill, in the Surguja State; it dates from the second or first century B.C. The wonderful frescoes of the Ajanta caves cover the period from 50 to 642 A.D. These paintings, which sometimes attain colossal proportions, exhibit scenes from the life of Buddha, remarkable for their lines, coloring, and power of expression. Other specimens of painting have been found at Bagh in Malwa. The explorations of Turfan (Chinese Turkestan), carried out since 1891 by Le Coq, Stein, and Grünwedel, have revealed the existence of fresco and distemper painting in which Indian influence is joined to Hellenistic, Persian, and Chinese, without its being possible at present to determine the share of India. On the other hand, Indian influence is clearly traceable in the Sigiri (Ceylon) frescoes of the fifth century A.D. and in the Buddhist art of Tibet, where it came from Nepal, of Cambodia, and of China. The latter country subsequently discharged its debt to India by indirectly influencing Indian miniature painting, though not so much as Persia and Central Asia. While the iconoclastic efforts of the Moslems are chiefly responsible for the absence of remains of painting in India for the nearly 1000 years elapsing between 642 (the close of the Ajanta series) and 1570 (the reign of Akbar), Indian tradition, combined with

Mughal influence, still survives in the Kangri paintings, of which there is an admirable collection in the Central Museum at Lahore. At later times painting was spasmodically employed and became popular in the decoration of sculpture. The identification of the numerous gods by means of their symbols or emblems, and the emblematic use of different colors in their dress, made color an essential element in statuary and relief work. The Mughals introduced the illumination of manuscripts from Persia, and miniature painting became popular, especially at Delhi. The Emperors Akbar and Jahangir are especially famed as promoters of this art. Excellent collections of miniatures are shown in the Calcutta Art Library, the Khuda Bakhsh Library at Bankipur, the Newcastle Library, etc. The Cochran collection in the Metropolitan Museum of Art, New York, contains a number of beautiful specimens. Colored facsimiles of fine miniatures may be seen in Havell, *Indian Sculpture and Painting* (London, 1908). A Bengali national school of Indian painting is a part of the *swadeshi*, or Nationalist, movement in India. Its chief representative is A. N. Tagore. Popular, religious, and mythological painting, too conventional to admit of individual treatment, was probably never absent from India. In it details are often brought out in relief, and gilt gesso and glass and sometimes pearls and jewelry are used to enhance the effect. The purely decorative religious symbols are frequently graceful and elegant of design.

Jewelry. Of all the smaller arts in India, jewelry is the most universally interesting and beautiful. The techniques of filigree and granular work, only recently rediscovered in Europe after antique models, were never lost in India. (See Filigree.) There are at least three very primitive types of jewelry: (1) the heavy gold wire twisted into collars, girdles, bracelets, anklets, and necklaces, used originally throughout India; (2) the chopped gold style, made of flat or cubic pieces, strung together and either solid or hollow, all of general use, but now most popular in Gujarat; (3) the flat beaten silver type of many primitive tribes, similar to early Celtic work. There evidently is great similarity between the Indian races and the Etruscans in the profusion of jewelry that was always worn, as is evident from the earliest literature, such as the *Rig-Veda;* and the sculptures show that its forms have remained unaltered for over 2000 years. The present schools are those of Ahmadabad, with its archaic style; of Mysore, Vijanagara, and other towns, in thinnest pieces of beaten gold; of Kashmir and the Punjab, for the use of gems and enamels in richest but always tasteful variety; of Sind and Baluchistan, similar but more solid and severe; of Oudh, formerly centred in Lucknow, similar to that of Delhi and Lahore; of Cuttack in Orissa, famous for silver filigree work; and a multitude of minor centres, like Dacca and Dinajpur in Bengal, the work of the last-mentioned place strongly resembling the primitive Indian. The Parsis of Bombay long held on to antique Persian forms, and the south used mythological subjects. The school of Trichinopoly, with very rich chains, necklaces, and bracelets, has long been a favorite one with Europeans. In short, India has sounded every extreme and form of jewelry, from the most simple and primitive to the richest and most elaborate. (See Jewelry.) Goblets and other objects of gold and silver are made by jewelers, as the arts of jewelry and gold work are not separate in India.

Pottery. Even more than jewelry the pottery of India, especially in its unglazed varieties, preserves the ancient forms shown in the early sculptures and paintings. The potters of the villages have never changed these forms since very early times. In fact, the special preeminence of the best Indian pottery has always been the strict subordination of color and ornament to form and the conventionalizing and repetition of natural forms in the decoration. Unglazed pottery has been made everywhere in India, and still survives quite generally, especially in the Punjab. Decorative pottery for commercial purposes, painted, gilt, glazed, or even pierced, is made in special varieties in different provinces: e.g., the gilt pottery at Amroha, the black and silvery ware at Azimghar, whose meretricious art is in great contrast to the beautiful glazed ware of Sind (Hyderabad, Jatta, Jerruck, etc.), of Madura, and of the Punjab (Lahore, Delhi, Yang, etc.). The glazed ware of these three schools only is worthy of standing beside the beautiful primitive unglazed pottery. Their knop and flower patterns, and other favorite floral designs, imitate classic and even Assyrian, Persian, and Egyptian originals; the shapes of the vases recall the antique examples found in Oriental, Etruscan, and Greek tombs. The turquoise blue, golden brown, dark green, or purple colors are the most beautiful. The exquisite color tones and combinations can be studied even better in the glazed tiles which came into fashion with the Mohammedan conquest after the eleventh century. These encaustic tiles, when used to cover large wall spaces, or even entire buildings such as mosques, produce an unparalleled effect of splendor. Here especially is Persian influence predominant. The potter was also the image maker, producing innumerable painted clay figurines, mainly of the gods, to be worshiped in families and shrines. The Indians never fabricated porcelain.

The great skill of the Indian potter can be judged from the size as well as from the quality of the vessels he shapes on his wheel and afterward succeeds in baking. In Ahmadabad and Baroda are made jars for storing grain often 5 feet high; in Dacca, on the banks of Dol Samudra, jars of nearly a ton capacity; in Bengal, clay figures of Karthikeya, the Indian Mars, from 25 to 30 feet high. The sumptuous glazed pottery of Sind and the Punjab was probably introduced into India from China via Persia by the Afghan Moguls through the influence of Tamerlane's Chinese wife. Some of the unglazed water vessels still made in every Hindu village have the same forms as those represented on ancient Buddhist sculptures and paintings. The fact that the Hindus have a religious prejudice against using an earthen vessel twice, generally breaking it after the first pollution, causes an immense native demand for the cheap unglazed cooking pots, water jugs, and frying pans. The tiles made in India are inferior to, but resemble, Oriental tiles of the type that adorn the mosques of Egypt, Syria, Turkey, and Persia.

Metal Work. The best illustration of the skill of the Indians in foundry is furnished by the huge iron pillar at Delhi from the time of Chandragupta II (fifth century A.D.), the like of which European industry was not able to produce up to the latter part of the nineteenth century. Although wholly exposed to rain, it never rusted. A still larger one (over 42 feet in length) is found at Dhar. It dates from 321 A.D. Among the branches of artistic metal work that of the arms and equipment of the great chieftains is prominent. The Buddhist, Hindu, and Jaina sculptures show how antique are many of the forms still in recent use, but of actual works that are preserved the finest do not date back of the great Mahratta warriors. There are two main schools, the Hindu and the Persian. The Punjab and Rajputana have been among the main centres of the art. A comparison of the three great schools of the mediæval Orient shows that the most delicate and simple was the Arab, with its fine filigree work; richer and more highly colored was the Persian with its damaskeening, enameling, and carving; but richest of all was the Indian, which indeed sinned, perhaps, by excess of decoration, breaking the outlines and the color scheme by high relief, hammered and cut goldwork, and a multitude of gems. The collection of the late King Edward VII has the finest examples of damaskeened suits, of crusading blades carved in relief, and of early matchlocks. The use of carved ivory often gives added brilliancy. Diamonds, rubies, and emeralds are the principal stones used, and the designs are largely floral. The collection of the India Museum ranks next to that of King Edward VII. Of the chieftains' swords valued as heirlooms and state possessions, the finest are those of Sivaji, Sultan Chand, and Polygar Katabomma Naik.

Damaskeening (*koft*) in gold and silver wire is a process probably imported during the Middle Ages into India from Persia and Syria. It is practiced in Kashmir, the Punjab, and the Nizam's dominions, though originally of wider use. The ornamentation is in floral patterns, either naturalistic (Bider) or conventional (Purniah). The boxes, hookah bowls, vases, and caskets with this decoration often equal the best Mohammedan work of Egypt and Persia and are among the most harmonious of Indian industrial works for form and well-composed ornament. The relief work in metal is less chaste and admirable, whether in brass, copper gilt, bronze, or the precious metals, where the high relief technique and human and animal figures are often used. The gold and gilt work, however, is usually exquisite. The oldest examples are Buddhist pieces found in the Punjab and Afghanistan with Græco-Roman characteristics. The later work in chased parcel-gilt and gold sometimes pierced, especially that of Kashmir, is beautiful in shape, the gold being often given a ruddy hue or olive brown. Lucknow, Dacca, Cutch, and Gujarat have been famous goldsmith centres. The copper industry is especially flourishing at Tanjore and Madura. It is practiced by a special caste.

Images or idols of gold and silver, brass and copper, or of an elaborate alloy, have always been profusely used in private houses for worship. Some are of gold, as those of Krishna and Sarasvati; others of silver, as those of Sitala; others of copper, such as those of the sun Surya and the serpent Naga. The larger figures are always cast and finished by hand. Mention may also be made of the inimitable bronze statuettes from Vizagapatam, which are a part of the collection of King Edward VII.

Of especial merit are the champlevé enamels in red, green, and blue on gold, done at Jeypore by Sikhs whose ancestors were brought there from the Punjab by Maharajah Jeysingh. There still exist in India innumerable specimens of arms and armor, showing how important was the armorers' work until the *Pax Britannica* put an end to the constant wars between the native states and principalities. Damascus steel is still made at Samandrum, near the Dimdurti mines that have been a source of supply from time immemorial.

Carving. Anciently, elaborate wood carving adorned the thrones of rajahs and princes, the chariots of warriors, and the buildings of all classes. In the Punjab, the Northwest Provinces, Central India, and the Bombay and Madras presidencies, carved façades, doors, windows, balconies, partition screens, and furniture are still made, of high quality and in large quantity. In Burma the Buddhist monasteries and temples are mostly of wood elaborately carved. Carving in *black wood* is an art that has been especially developed in the Madras Presidency. Teakwood carving is also becoming common, as is *tarkashi* work that combines inlaid brass with carving. Sandalwood is a favorite material for fans, combs, rosaries, paper knives, etc. Ivory carving and lacquer work (q.v.) of high quality are produced in many parts of India. See INLAY; MOSAIC; RUGS, ORIENTAL; TEXTILE PRINTING.

Enamel. The extremely difficult art of enameling in champlevé is still practiced in greatest perfection by Sikh craftsmen at Jaipur in Rajputana, unique for the beauty of its ruby reds, coral reds, emerald greens, and turquoise and sapphire blues. Somewhat less perfect are the products of the schools of Lucknow, Benares, and Lahore. Gujarat puts out small objects. Indian enamels are combined remarkably with precious stones. Transparent enamels are used with success, and sometimes a thin plate of gold cut in elaborate scenes of figures and ornamentation and etched with a graver is superposed over an enamel ground melted on a gold back. Spoons, cups, vases, etc., of enameled gold are made at Jaipur, Merwara, Delhi, and Benares; Lahore, Hyderabad, and Lucknow excel in silverwork. The caskets of Pertabghar and the niellé copper objects of Muradabad and Kashmir enjoy a well-deserved fame. In lacquer work, especially as associated with Persia, Indian art is even more preëminent.

Woven Fabrics. The brocades, embroideries, woven tissues, laces, tapestries, and the like, so long one of the greatest prides of India, have suffered more than any other branch of art industry. Kashmir is the home of world-famous woolen shawls, rich in color, brilliant; Surat produces silk prints; while the most sumptuous brocades come from Ahmadabad, Benares, and Murshidabad. The gold-embroidered velvets for state canopies, housings, and caparisons are especially rich. But their designs are not so purely Oriental as are those of the appliqué work on cloth and the early rugs and carpets with their Persian compositions of birds and animals. The jail industry and the so-called schools of industry have done even more than the rush orders from Europe to degrade the quality—both material and artistic—of India carpets.

Textiles. India has long been famous for its silk and cotton textiles, printed and embroidered as well as loom-figured. Cotton fabrics of almost every kind are made in Lahore, Amritsar, Multan, and Ludhiana, the last-named city giving its name to the drills and checks produced there. The chintzes of Jaipur and Jodhpur are prized all over India for the purity, brilliance, and fastness of the dyes. At Benares are made gold-figured muslins, and at Bijnor the sacred gold cord and sacrificial thread of the Brahmans. The *bandana* fabrics of Gujarat and Rajputana in the Bombay Presidency are especially interesting on account of the method of dyeing. The cloth, while still in the natural, is tied up with thread into a pattern of tiny squares. When the knots are untied after dyeing, the red or blue ground is seen to be figured with tiny white squares which the dye could not reach. The centre of these squares is often painted yellow by hand. From this process *bandana handkerchiefs* got their name. Sometimes the process is complicated by a succession of tyings and dyeings and is then called *phul-wadi* (flower garden). The *wax-printed* cloths of Peshawar and Deesa are made by applying a mixture of melted lac and beeswax with a wooden stick. Finely powdered mica is then sifted over the design, and the mixture dries hard so that the cloth can stand washing and rough usage. The mica gives it a brilliant lustre. From Poona and Satara come gold-leaf prints, studded with tiny pieces of mirror glass. From Surat come *razais* (bedcovers) brocaded in small squares. The quantity of stuffs, part cotton and part silk, made in India is very great, the Mohammedans being forbidden by the laws of their religion to use pure silk. The brocaded *kincabs* from Benares, Surat, and Ahmadabad have been famous for centuries. From Surat and Madras come silk *sarees* with fancy edgings and trimmings worn by the Hindu ladies as gowns. Embroideries are part of the costume of almost every native in India. The most famous embroideries are those of Kashmir. Excellent in design and workmanship are the silk-on-cotton *phulkaries* from the Punjab and the Hazara frontier. The colors of the Cutch phulkaries are particularly attractive. The tinsel-embroidered stuffs of Delhi, Agra, and Madras, are used for gowns, draperies, bed and table covers, cushion and pillow covers. Rampore *chuddars* are made in plain texture from *pashm*, or *pashmina*, which is the fine, short, soft flossy underwool of the *Capra hircus*, a goat that lives on the lofty table-lands of Tibet. The reason for the name *chuddars* (ring shawls) is that one of them 6 by 12 feet can easily be passed through a finger ring. From this same *pashmina* are made the famous Kashmir shawls, some figured in tapestry weave, with the usual open slits left in tapestry weaving where colors meet parallel with the warp, as well as intricate embroideries in which the "cone" is a prominent feature. The making of pile rugs in the Persian fashion appears to have been introduced into India by the Mohammedans in the fourteenth century and became an important art industry in the sixteenth century. (On modern India rugs, see the article RUGS, ORIENTAL.) Among rugs for ceremonial use are those richly embroidered in gold and silver at Benares and Murshidabad, and those with silk pile made at Tanjore and Salem. Commonly used in India, and also exported to Europe and America, are *durries* (cotton rugs woven flat without pile) in great variety of designs.

During the last half of the nineteenth century the decline of the decorative arts in India was marked. Machine-made goods were imported from Europe in constantly increasing quantities to take the place of the beautiful native handmade draperies, furniture, clothing, and jewelry, that centuries of artistic development and inheritance had brought almost to perfection. Even the rajahs and the princes of India ceased to encourage domestic art, and the wealthy traders no longer purchased what they could no longer sell. Thousands of the most skillful artisans faced starvation, and many were compelled to obtain other employment. Finally the British government of India began to appreciate the situation and endeavored to remedy it by establishing art schools at Bombay, Madras, Calcutta, Rutnagiri, and Lahore. The native states opened similar schools at Jaipur, Alwar, Cutch, and Kolhapur. Large commercial firms, both native and European, began to exploit native Indian decorative goods in the markets of Europe and America, and the exhibit of Indian art at the Chicago Exposition in 1893 was noteworthy.

Bibliography. Important work on the history of Indian art has recently been done by Vincent Smith and Ananda Coomaraswamy. Especially useful are Smith, *History of Fine Art in India and Ceylon* (London, 1911), which gives full bibliographical information, and Coomaraswamy, *Arts and Crafts in India and Ceylon* (ib., 1913), with a useful chronological synopsis of India's art history. *The Journal of Indian Art and Industry* (London, 1886 et seq.) is a rich mine of information; Le Bon, *Les civilisations de l'Inde* (Paris, 1887), is good in spite of its early date of publication. For architecture, consult: *Archæological Survey of India*, published by the government (London, 1874–1901); Fergusson and Burgess, *Cave Temples of India* (ib., 1880); Le Bon, *Les monuments de l'Inde* (Paris, 1893); Fergusson and Burgess, *History of Indian and Eastern Architecture* (London, 1899; 2d ed., 1910), which must be consulted in connection with the work of Smith mentioned above; Burgess, "Indian Architecture," in the *Imperial Gazetteer of India*, vol. ii (Oxford, 1907), with bibliography; Havell, *Indian Architecture* (London, 1913); and the various publications of Cunningham. Sculpture is well analyzed in the work of Vincent Smith; a less scholarly treatment of the subject is by Havell, *Indian Sculpture and Painting* (London, 1908), excellently illustrated, written from an artistic standpoint as distinguished from the archæological, but somewhat overenthusiastic. For the minor arts, the best general authority is still Brantwood, *Industrial Arts of India* (London, 1880, 1884), which must be used in conjunction with vol. xii of the *Journal of Indian Art and Industry* (ib., 1907–09) and with Watt, "Arts and Manufactures," in the *Imperial Gazetteer of India*, vol. iii (Oxford, 1907). Vol. xi of that publication is devoted to rugs. The bronzes have been dealt with, among others, by Coomaraswamy in the *Burlington Magazine*, pp. 86–94 (London, 1910). For Buddhist art, consult: Griffiths, *Paintings in the Buddhist Cave Temples of Ajanta* (ib., 1896–97); Grünwedel, *Buddhist Art in India* (trans. and rev. by Burgess, ib., 1901); Foucher, *L'Art gréco-bouddhique du Gandara*, vol. i (Paris, 1905). The latest publication on Jaina art is by Coomaraswamy, "Notes on Jaina Art," in *Journal of Indian Art and Industry* (London, 1914). Consult further, Baden-Powell, *Manufactures and Arts of the Punjaub* (Lahore, 1872); Fergusson, *Tree and Serpent Worship* (2d ed., London, 1873); J. F. Watson, *The Textile Manufactures and Costumes . . . of India* (ib., 1866); id., *Collections of Specimens of Textile Manufactures* (2d series, ib., 1873–77); Mukharji, *Handbook of Indian Products* (Calcutta, 1883); id., *Art Manufactures of India* (ib., 1888); Coles, *Catalogue to the Objects of Indian Art in South Kensington Museum* (London, 1874); Hendley, *Memorial of the Jeypore Exhibition* (ib., 1884); id., *Ulwar and its Art Treasures* (ib., 1885); id., *Jeypore Enamels* (ib., 1886); Watt, *Indian Art at Delhi* (ib., 1903); Vincent Smith, "Archæology of Historical Period," in the *Imperial Gazetteer of India*, vol. ii (Oxford, 1907); Havell, *Ideals of Indian Art* (London, 1911); Coomaraswamy, *Mediæval Sinhalese Art* (Broad Campden, 1908), and his series of illustrations of Indian art, *Viśva-Karma* (ib., 1912 et seq.); Martin, *Miniature Painters of Persia, India, and Turkey* (London, 1913).

INDIANA UNIVERSITY. A coeducational institution of learning, situated at Bloomington, Ind. It was founded in 1820 as Indiana Seminary and was rechartered as a university in 1838. The university is an integral part of the State public-school system and admits pupils from commissioned high schools without examination. It maintains professional schools of law and medicine and confers the degrees of bachelor of arts, bachelor of science, bachelor of laws, doctor of medicine, master of arts, and doctor of philosophy. The university has a biological station on Winona Lake. The summer school, formerly privately conducted, is now a part of the university. The elective system was introduced in 1885. In 1914 the faculty numbered 125, and the attendance was 2530, including 168 in the law school. At the same time the university had grounds and buildings valued at $650,000, an endowment fund of $600,000, and an annual income of $500,000. The library contains 80,000 volumes. The president in 1914 was William L. Bryan, Ph.D., LL.D.

INDIAN BADGER, Buffalo, etc. See Badger; Buffalo, etc.

INDIAN BEAN TREE. See Plate of Calabash, etc.

INDIAN BIBLE. An Algonquin version of the Bible made by John Eliot (1661–63). This translation was the earliest version of the Bible to appear in America.

INDIAN CAUCASUS. See Hindu Kush.

INDIAN CORN. See Maize.

INDIAN CRESS. See Tropæolum.

INDIAN EMPEROR, The, or, The Conquest of Mexico by the Spaniards. A tragedy by Dryden, successfully produced in 1665. It forms a sequel to the *Indian Queen*.

INDIAN FIG. See Cactus; Prickly Pear.

INDIAN FIRE, or Bengal Lights. A bright white signal fire, consisting of a mixture of potassium nitrate 24 parts, sulphur 7 parts, and arsenic sulphide (realgar As_2S_2), 2 parts. The latter is often replaced with antimony sulphide. Slow-burning mixtures are produced by replacing the sulphur with ground shellac. Mixtures of collodion and magnesium powder are evaporated in thin plates; these burn with great brilliancy.

INDIAN HEAD. A town in Qu'Appelle district, Saskatchewan, Canada, on the Canadian Pacific Railway, 40 miles east of Regina, the capital of Saskatchewan (Map: Saskatchewan, G 7). It is situated in a rich grain-producing district. It possesses a fine park. Its industries include lumber yards and planing-mill factories. A Dominion experimental farm and forestry farm are located here. Pop., 1911, 1285.

INDIAN HEAD. The highest point of the Palisades of the Hudson, opposite Hastings, so called from its resemblance to the features of a human being.

INDIAN HEMP. A very strong bast fibre obtained from the perennial herb *Apocynum cannabinum* and used by the American Indians for weaving and for cards and nets. It is also sometimes called Canada hemp.

INDIAN INDUSTRIAL AND TRAINING SCHOOL. (Official title United States Indian Industrial and Training School.) An institution for the industrial and academic education of Indian youth, founded in 1879 at Carlisle, Pa. The school resulted from experiments in Indian education made by Capt. R. H. Pratt, beginning about 1875. At that time the government schools which had in charge the education of Indians admitted also colored students. Captain Pratt, being convinced of the differing characteristics of the Indians and the negroes, resulting from conditions of their heredity and environment, wished to attempt the experiment of educating Indians alone. He considered best for the success of the venture that the school should be situated in the midst of civilization, in order that the students might become influenced, perhaps unconsciously, by the habits and customs of civilized white persons. The school was established at an abandoned army post at Carlisle, and the first pupils were 82 Sioux boys and girls. The school prospered, and Indians from more than 70 tribes have been received and graduated. One of the aims of the school is to develop the individuality of its students, and in order to familiarize them with conditions of life among white people, a system of placing students out in families and as farm laborers has been evolved, over 800 students each year being thus placed out. The school is composed of an industrial and an academic department. In the industrial department instruction is given in practical mechanics, and in the academic department the courses correspond in a measure to those of the common and high schools. Athletics have always been a prominent feature, and it has been found that the young men have special aptitude for football. The Carlisle football team has been for more than 20 years one of the most famous of college teams and has defeated at one time or another most of the large colleges and universities. There were in the school, in 1914, 995 students and 44 instructors. There is a library of about 2500 volumes. The supervisor is Oscar H. Lipps.

INDIAN LANGUAGES. The languages of India are both numerous and important. Cust, in his book on the *Modern Languages of the East Indies* (London, 1878), enumerates nearly 250 Indian languages and some 300 dialects. Of these languages divisions are: first, the group of Aryan tongues spoken throughout the entire northern half and central portion of India; second, the unrelated Dravidian group (see Dravidians) in the south; third, the Kolarian languages scattered here and there in central Hindustan; fourth, the Tibeto-Burmese family of non-Aryan tongues, distributed over the vast area which the name implies; fifth, the Khari, an isolated language near Bhutan. To these may be added likewise two Indo-Chinese spoken families, viz., the Thaī, under which comes the Siamese, and the Mon-Annam family, which takes in the Cambodian and Annamite. It may furthermore be stated, for completeness, that the languages of the great Malayan family spoken in Sumatra, Java, Borneo, and the Celebes, and even in the Philippines, have certain Indian affinities or show the influence of the various tongues of India.

The Aryan group of languages in India has preëminence alike for the number and the character of the people that speak those dialects, and for the genius of the languages themselves, as well as for the long historical development of this branch and for the literature attached to it. In point of time the Aryan division of Indian tongues covers a period of culture extending from at least 1000 years before the Christian era down to the present time. Broadly viewed, these periods may be recognized in the history of this division of dialects: (1) *Old Indian*, comprising the earliest Vedic dialect and the historic form of the speech known as Sanskrit (q.v.); (2) *Middle Indian*, which embraces Prakrit (q.v.) and Pali (q.v.), both of which are descended rather from the Vedic dialect, or its kin, than from the classical Sanskrit; (3) *New Indian*, including the modern vernaculars of the more cultivated peoples of Hindustan. The general characteristics of the Vedic idiom, together with certain peculiarities of the epic speech, and the classical development of the language will be found in the article on Sanskrit Language. Under the Middle Indian or Prakrit group are comprised the Maharashtri dialect, or Prakrit par excellence, with its Jaina varieties, likewise the Māgadhī or Ardha-Māgadhī, the Saurasenī, which is found in the dramas, the Aphabhraṁśa and the Pāiśācī. The New Indian group, geographically arranged, takes in the vernaculars of Assam, Nepal, and Kashmir (the latter called Kasmiri), also Uriya, Bengali, Behari, Hindi, the dialects of the Punjab and of Sind, likewise Gujarati, Marathi, the Singhalese of Ceylon, Maldive, and Gypsy. See also India, *Language*.

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INDIAN MADDER. See Chay Root.

INDIAN-MEAL MOTH. One of the most familiar moths (*Plodia interpunctella*) that infest the cereals, Indian meal, dried yeast cakes, and dried fruits, nuts, etc. The moth has wings which are reddish brown on the outer two-thirds and dirty whitish gray on the inner third. It has a wing expanse of rather more than half an inch. The larva is white, brownish-headed, and wormlike. It spins silken tubes through the substance on which it is feeding, and its excrement and portions of the food adhere to this web.

INDIAN MILLET. A term applied to certain nonsaccharine sorghums. See Millet.

INDIAN MUSIC. The music of the aborigines of North America, although never reduced by them to a written science, is nevertheless marked by distinct racial characteristics. Of the greatest importance to the Indian musician was the emotion to be expressed; to this everything was subordinated. As a result, the Indian songs can be divided into certain stereotyped classes (such as burial, love, war songs), in each of which the similarity of the different melodies is most marked. This monotonous character of their tunes is an outgrowth of the very elements which among civilized peoples have been skillfully blended to produce original and unusual effects; for preëminent in Indian music are complicated rhythms (many of them as intricate as those of Schumann and Chopin) and a frequent use of syncopation. When it is remembered that they had no strict forms to restrain them, it will be seen how these two strong elements came in time to dominate and confine their whole musical system. The strictly technical side of Indian music is of less interest. Their scale, like the Chinese, Hindu, etc., consisted of five tones and was for the most part major; their melodies generally ran from the top of the scale to the bottom; their conception of time was very exact; but they had no part singing, no way of determining pitch and consequently no universal key. Of most interest to the cultured musician are the wonderful transitions which we find everywhere throughout the native songs. The smoothness and rapidity of their changes from key to key are unsurpassed even in European music. The Indians had a sense of harmony, but, owing to the crudity of their musical science, it was never developed. Only by the use of wooden drums, tuned to different pitches, did they get a sort of crude bass. Besides the drums their instruments consisted merely of a flute (with a scale of seven notes), a whistle (with a scale of five notes), and a rattle, made of dry gourds, loaded with sand or pebbles. In recent years the study of Indian music has received considerable attention, and every effort is now made to collect and preserve as much of the aboriginal melodies as can be found. Some American composers, especially Victor Herbert in his *Natoma*, have made use of real Indian themes.

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INDIAN MUSIC. See Hindu Music.

INDIAN MUTINY, or Sepoy Rebellion. See under India.

INDIAN MYTHOLOGY. The mythology of India as found in the ancient hymns of the *Veda* deserves especial consideration, because it represents an earlier state of thought with regard to mythological subjects than is found in any other literary monument of the Indo-Germanic peoples. The development of Hindu mythology down to the present is furthermore of interest because of the chance it gives for a long historical perspective. Attractive parallels may likewise be drawn between the oldest mythological figures of India and those in the pantheon of Greece and Rome, like Father Heaven and Mother Earth (Skt. *Dyāuṣ Pitar*, *Pṛthivī Mātar*, Gk. *Ζεὺς πατήρ*, Lat. *Jupiter*); but they are often erroneous, dangerous, or misleading. Despite, e.g., the recognized possibility of kinship by reason of common Aryan or Indo-Germanic unity, such etymological equations as those between Lat. *Uranus*, Gk. *Οὐρανός* (Heaven), and Sanskrit *Varuṇa*, in Indian mythology, or again between *Κένταυρος* and *Gandharva*, or the fire myth of *Prometheus* in connection with Skt. *pramanthana*, the rubbing stick used in kindling fire, break down or become uncertain under the searching light of keen linguistic criticism. Nevertheless such comparisons are always interesting, and they are often instructive as showing how myths may develop independently or on grounds remotely associated or even disconnected. The mythology of India frequently helps to throw much light on such subjects. Myths abound in the *Rig-Veda;* they are the outgrowth of personifications of the powers of nature and meteorological phenomena. (See Agni; Indra; Marut; Mitra; Soma; Surya; Ushas; Vayu; Yama.) In later Hindu mythology the gods of the old régime gradually become replaced by the great Hindu trinity or triad, Brahma, Vishnu, and Siva, with all the beliefs and notions associated with each of these names. The later pantheon is occupied likewise by a band of minor deities, godlings or demigods, like Ganesa, Kartikeya, Kubera, and the goddesses Durga, Lakshmi, and Sarasvati. (See the articles under these names.) India of all ages has known also many myths, legends, or fables connected with the stars and planets, with sacred rivers, streams, and trees, birds, and animals. Consult: Dawson, *Dictionary of Hindu Mythology and Religion* (London, 1879); Macdonell, "Vedic Mythology," in Bühler, *Grundriss der indo-arischen Philologie und Altertumskunde* (Strassburg, 1897); W. J. Wilkins, *Hindu Mythology* (London, 1900); Viggo Fausbøll, *Indian Mythology According to the Mahābhārata in Outline* (ib., 1903). See Brahmanism; Hinduism.

INDIAN OCEAN. One of the five grand divisions of the hydrosphere, bounded on the west by Africa and the twentieth meridian east of Greenwich (running through Cape Agulhas, the south extremity of Africa), on the north by Asia, on the east by the East Indian Archipelago, Australia, and the one hundred and forty-seventh meridian (running through the south extremity of Tasmania) (Map: World, Eastern Hemisphere, K 28). The south boundary is in an indefinite way assumed to be approximately the Antarctic circle, although many geographers prefer to call what is south of lat. 40° S. the Southern Ocean. In its broader sense it covers about 27,500,000 square miles. Gradually narrowing from south to north, the Indian Ocean forks at Cape Comorin into the Bay of Bengal on the east and the Arabian Sea on the west, the latter again branching off into two arms, the Persian Gulf and the Red Sea, which reach respectively the mouth of the Euphrates-Tigris and the neighborhood of the Mediterranean. These limitations exclude the waters of the Indian Archipelago, as belonging rather to the Pacific Ocean. From Africa it receives the waters of the Limpopo and the Zambezi, and from Asia those of the Irrawaddy, Brahmaputra, Ganges, Indus, and the Shat-el-Arab. It contains numerous islands, chiefly confined to the northern and western regions. Of these Madagascar and Ceylon are the only ones of considerable magnitude, the others being mostly small groups of volcanic or coral formation, the volcanic islands being usually surrounded by coral reefs.

The greatest depth of the Indian Ocean is found in the northeastern part, where, close to the southeast of Java, soundings have been made of 20,340 feet, and a basin, 50,000 square miles in area, of nearly this average depth lies to the northwest of the Australian continent. An elevated ridge running along the fortieth parallel has an average depth of 12,000 feet. Krümmel estimates the average depth of the ocean to be 10,970 feet, although it is generally given as about 14,000 feet. The surface temperature of this ocean is higher than that of the others, the mean temperature of the northern portion being considerably over 80°, while the bottom temperature, falling below 40° at the equator, indicates an undercurrent of cold water from the Antarctic region. The currents of the Indian Ocean depend to a great extent on the winds. North of the equator they reverse their direction with the annual change of the northeast monsoon to the southwest monsoon, while under the equatorial calm belt the equatorial countercurrent flows eastward. South of the equator, under the southeast trade winds a current flows west, bending south along the coast of Africa through the Mozambique Channel, and meeting the Atlantic westward current at the Cape, where it is turned back to the east towards the south coast of Australia. The winds over the Indian Ocean are, as a rule, gentle, with frequent protracted calms, though hurricanes occur occasionally. This ocean was the first to find a place in the history of commerce. As a commercial channel, it virtually maintained its superiority during 2000 years, being habitually traversed in a direct line between Arabia and Hindustan, while coasting voyages alone were known in the Atlantic. This comparatively bold navigation of the Indian Ocean was suggested and facilitated by the periodically alternating monsoons of the northern part.

INDIAN OIL TREE. See Butter Tree.

IN′DIANO′LA. A city and the county seat of Warren Co., Iowa, 22 miles by rail south of Des Moines, on the Chicago, Rock Island, and Pacific, and the Chicago, Burlington, and Quincy railroads (Map: Iowa, D 3). It controls a large trade in grain, butter, eggs, live stock, fruit, and vegetables. The city has a Carnegie library and Simpson College (Methodist Episcopal), opened in 1867. The water works and electric-light plant are owned by the municipality. Pop., 1900, 3261; 1910, 3283.

INDIAN PEOPLES. For the anthropologist India is of remarkable interest. On its soil may still be met all grades of culture, from the savagery of hill and swamp to the urban civilization born of river and plain, and all forms of human social aggregates, from the primitive family group or clan to the foreign-ruled provinces with their magnificent and luxurious capitals. Here all forms of agriculture are to be found, from the burned-over forest plot to the terraced hillside of the north; in the west and south the utilization of the desert by canals and tanks; all varieties of human dwellings, from the primitive abode in tree and cave to magnificent palaces and temples; all forms of human government, from the primitive democracy and tribal anarchy to organized despotism of the civilized sort; all kinds of marriage, from polygamy to the strictest monogamy, and all varieties of both these systems and of polyandry as well; and also all forms of religion from the crudest animism and Shamanism to the agnosticism of certain developments of Buddhism. All these things have been invented, exploited, modified, improved, or degraded by members of the black, the brown, the yellow, and the white races of man for many thousands of years; so that nowhere else in the world have so many millions of human beings done so many things at so many times in so many ways as in India. Remains of the industry of Paleolithic man have been found almost everywhere throughout the peninsula, which makes India seem almost as old as the race of man itself. By far the most important peoples of India belong to the Aryan stock. They are responsible for a number of social and religious ideas and institutions, many of which are simply the expression of the mentality of the more northern and western Aryan in the process of, and after adaptation to, an Oriental and largely tropical environment. They never overcame the land by mere force of numbers, and their influence upon the pre-Hindu population was less racial than social and religious. Many primitive tribes who took over the culture of their conquerors have become assimilated to the Aryan type while preserving intact their aboriginal speech. The complicated caste system (see CASTE) is largely, if not entirely, the result of the contact of the Aryan invaders with the aboriginal population (Dravidian, Kolarian, etc.) of the peninsula, and of the efforts of the conquering race to preserve its purity as much as possible against miscegenation. It was very early dominated by religious ideas, but recent investigations have shown that the lines of caste are not nearly so coincident with racial distinctions as had been assumed to be the case. After the Aryans of India, the Dravidians (the civilized Tamils, Telugus, Kanarese, and Malayalams), the more or less civilized Kodagu, or Koorgs, and the tribes of the Nilgiris, Central India, Orissa, part of Bengal, etc., such as the Irulas, Kurumbas, Badagas, Todas, Kotas, Kader, Khonds, Gonds, Oraons, and Maler, are the most important peoples. The various tribes of this stock illustrate all grades of human culture, from the jungle-dwelling Kurumbas to the high developments of the civilized Tamils, who in literature, architecture, and other arts have shown great ability, and some of them notable capacity for assimilating both Hindu and Christian culture. The Dravidian area lies chiefly in southern India; but the Tamils have extended their influence over the north of Ceylon, forming a very important part of the population of that island.

Next to the Dravidians are to be considered the Kolarian peoples (Munda-Kols, Larka-Kols, Bhumij, Santals, Kharia, Juang, Saoras, etc.) of the Orissa-Bengal country and farther inland. The Santals represent the highest development of Kolarian culture, and the Juangs perhaps the lowest; while the others, except some of the Kols, are more or less primitive. Like the Dravidians, the Kolarians, who are looked upon by some as a people even older, have given to and taken from the ancient and modern Hindus and have also undoubtedly affected the physical type of both Dravidians and Aryans. In the Kolarians, as in the Dravidians, certain scholars detect traces of negroid intermixture, as well as much Aryan and some Mongolian blood. The Veddas of Ceylon, by some ethnologists classified as a separate variety of mankind, certainly are one of the most primitive peoples now existing. They have been thought to represent the oldest nonnegroid population of India, now disappearing. Some have sought to class the Todas of southern Hindustan as a peculiar people. The islands off the Indian coast present some interesting tribes. The Selungs of the Mergui Archipelago are classed by Deniker as Indonesians; but this is rather doubtful, and a like uncertainty exists regarding the inhabitants of the Nicobar Islands, the natives of the interior of Great Nicobar being savages of a rather primitive type. The Minkopis, or Andaman Islanders, are characteristic Negritos, whose extension must at one time have been much greater. In Assam, Burma, and the Malaccan possessions and protectorates of Great Britain, a great variety of peoples are to be found, chiefly of Indo-Chinese, Proto-Malay, and so-called Indonesian origin, besides the Sakai and Semang of Malacca, who are more or less Negritos. Among the most notable of these peoples, outside of the Burmese, Karens, etc., are the Nagas of Manipur, the Chins of Burma and Arakan, the Lushai tribes of Assam, the Shans of northern Burma, and some other tribes.

The anthropological history of India includes the following successions and impacts of races: pre-Dravidian and pre-Kolarian (with mixtures of Negrito and Proto-Malay); Aryan (invasion by the northwest as early as 2000 B.C. at least); Greek invasion, in the time of Alexander the Great (locally important in the Indus region, and more important as partly opening India to the Western world); Bactrian invasions of the northwest (following the Greek and of local importance); Mohammedan invasions (1000–1400 A.D.), resulting in the establishment of many dynasties in the northwest and west, including the famous Mogul Empire of Delhi and its successors of the eighteenth century, which were broken up by the revolt of the Mahrattas and Sikhs, who restored Aryan supremacy. Besides these must be counted the Pathan influence in the northwest at various times, the Mongol (Tibeto-Sinitic) influence from a comparatively early period in the Himalayan region, and Indo-Chinese and related influences in the northeast. Malayan elements also were present in the south and east, with the later Arabo-Persian, Dutch, Portuguese, French, and British commercial, missionary, and political achievements. The Parsis (Persians), who are settled chiefly in Bombay, are of great importance in spite of their limited numbers; the Jews have had some influence on the east coast; and the Chinese in Ceylon. Since coolie labor has been in demand, natives of India have found their way to Madagascar, the West Indies, Guiana, and Africa.

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INDIAN PHYSIC. A genus of North American herbs. See Gillenia.

INDIAN PIPE. See Cancer Root; Root Parasites.

INDIAN POKE. See Hellebore.

INDIAN POPULATION. According to the latest census returns there are in the United States and Canada 400,570 Indians and Eskimo. This number includes a large number of mixed parentage. In the United States the Indian population is distributed as follows:

Oklahoma	74,825
Arizona	29,201
New Mexico	20,573
South Dakota	19,137
California	16,371
Washington	10,997
Montana	10,745
Wisconsin	10,142
Minnesota	9,053
North Carolina	7,851
Michigan	7,519
North Dakota	6,486
New York	6,046
Nevada	5,240
Oregon	5,090
Nebraska	3,502
Idaho	3,488
Utah	9,123
Kansas	1,853
Wyoming	1,486
Colorado	1,482
Mississippi	1,253
Total	255,463
All other States	10,220
Alaska	25,331
Grand total	291,014

In Canada:

Alberta	8,113
British Columbia	24,781
Manitoba	5,919
Nova Scotia	1,969
New Brunswick	1,903
Prince Edward Island	300
Ontario	23,156
Quebec	11,571
Saskatchewan	9,545
Northwest Territories	12,953
Ungava	1,246
Yukon	3,500
Total Indian	104,956
Eskimo	4,600
Grand total	109,556

INDIAN QUEEN, The. A tragedy by Sir Robert Howard, in collaboration with Dryden, produced with great splendor in 1664.

INDIAN RED. An impure ferric oxide of a dark-red color, with a tinge of purple. It is used as a pigment. Indian red is prepared by calcining natural red ochre until most of the water of hydration is expelled. Occasionally soft red hematite of proper shade is obtained from deposits and requires no further treatment than grinding.

INDIAN RES'ERVA'TIONS. As early as 1786 the United States inaugurated the policy of setting aside certain lands and confirming the titles of Indians thereto. All such transactions were by treaty, thus recognizing to some extent the independence of the Indian tribes. At the same time control over the Indian was extended by conquest, so that in 1871 the government ordered that no more treaties should be made, but that all dealings with Indians should be under the immediate control of Congress. The administration of the reservations was, however, an executive function and, as such, delegated to the Department of the Interior, under which a distinct division was organized, Department of Indian Affairs. A reservation, as the name implies, is a tract of land reserved from settlement and held in trust for its Indian occupants. Such tracts were usually the residue of tribal claims after conquest or purchase. In 1887 the government adopted the allotting policy by which the lands of all tribes should be gradually divided with individual holdings and the surplus sold or thrown open to settlement, as the case required. Under this policy the reservations have been greatly reduced in size and number. Since under individual ownership the Indian becomes a citizen, it can only be a question of time when all such reservations shall have vanished.

The following is a list of the reservations existing in 1914:

ARIZONA

Reservation	*Tribes*	*Acres*
Camp McDowell	Yavapai	24,971
Colorado River	Chemehuevi, Kawia, Cocopa, Mohave	240,640
Fort Apache	Apache	1,681,920
Gila Bend	Papago	22,391
Gila River	Maricopa, Pima	357,120
Havasupai	Havasupai	578
Hopi	Hopi	2,472,320
Navaho	Navaho	12,115,283
Papago	Papago	27,566
Salt River	Maricopa and Pima	46,720
San Carlos	Apache	1,834,240
Walapai	Walapai	730,880
Total		19,554,629

CALIFORNIA

Reservation	*Tribes*	*Acres*
Digger	Maidu	370
Hupa Valley	Hupa, Yurok, Redwood	99,051
Mission (28 reserves)	Diegueños, Kawia, Luiseños, Serranos	202,216
Miscellaneous bands:	Grindstone	80
	Potter Valley	16
	Upper Lake	144
	Guidiville	50
	Tachie	80
	Sherwood	230
	Trinidad	60
	Ruffys	441
	Coyote Valley	100
	Redwood Valley	80
	Eel River	20
Round Valley	Pomo, Pit River, Wailaki, Yuki	37,000
Tule River	Yokuts, Mono	48,551
Yuma	Yuma	45,889
Total		434,378

COLORADO

Reservation	*Tribe*	*Acres*
Ute	Ute	483,750

IDAHO

Reservation	*Tribes*	*Acres*
Fort Hall	Bannock, Lemhi, Shoshoni	447,940
Lemhi	Lemhi	64,000
Total		511,940

IOWA

Reservation	*Tribes*	*Acres*
Sauk and Fox	Potawatami, Sauk and Fox, Winnebago	2,965

KANSAS

Reservation	*Tribes*	*Acres*
Kickapoo	Kickapoo	398
Potawatami	Prairie Potawatami	500
Sauk and Fox	Sauk and Fox	24
Total		922

MICHIGAN

Reservation	*Tribes*	*Acres*
Isabella	Saginaw Ojibwa	2,373
L'Anse	Chippewa	1,029
Total		3,402

MINNESOTA

Reservation	*Tribes*	*Acres*
Mille Lac		61,014
Red Lake	Chippewa	543,528
Vermilion Lake	Chippewa	1,060
White Earth	Chippewa	78,178
Total		683,800

MONTANA

Reservation	*Tribes*	*Acres*
Blackfeet	Piegan, Chippewa	959,644
Crow	Crow	1,836,753
Fort Belknap	Gros Ventre, Assiniboin	497,600
Fort Peck	Assiniboin, Brulé, Santee, Teton, Hunkpapa, Yanktonai	1,774,967
Northern Cheyenne	Cheyenne	489,500
Total		5,558,464

NEBRASKA

Reservation	*Tribes*	*Acres*
Omaha	Omaha	12,421
Winnebago	Winnebago	1,711
Total		14,132

NEVADA

Reservation	*Tribes*	*Acres*
Duck Valley	Piute, Paviotso	312,320
Moapa River	Chemehuevi, Piute	1,000
Pyramid Lake	Piute	322,000
Total		635,320

NEW MEXICO

Reservation	*Tribes*	*Acres*
Jicarilla Apache	Jicarilla Apache	286,400
Mescalero Apache	Mescalero, Lipan	474,240
Pueblo villages:		
Jemes		17,510
Acoma		95,792
San Juan		17,545
Picuris		17,461
San Felipe		34,767
Pecos		18,763
Cochiti		24,256
Santo Domingo		74,743
Taos		17,361
Santa Clara		49,369
Tesuque		17,471
San Ildefonso		17,293
Pojoaque		13,520
Sia		17,515
Sandia		24,187
Isleta		110,080
Nambe		13,586
Laguna		125,225
Santa Anna		17,361
Zuñi		315,040
Total		1,699,485

NEW YORK

Reservation	*Tribes*	*Acres*
Allegany	Onondaga, Seneca	30,469
Cattaraugus	Cayuga, Onondaga, Seneca	21,680
Oil Spring	Seneca	640
Oneida	Oneida	350
Onondaga	Oneida, Onondaga, St. Regis	6,100
St. Regis	St. Regis	14,640
Tonawanda	Cayuga, Seneca	7,549
Tuscarora	Tuscarora, Onondaga	6,249
Total		87,677

NORTH CAROLINA

Reservation	*Tribe*	*Acres*
Cherokee	Cherokee	63,211

NORTH DAKOTA

Reservation	*Tribes*	*Acres*
Devils Lake	Assiniboin, Santee, Sisseton, Yankton, Wahpeton	92,144
Fort Berthold	Arikara, Hidatsa, Mandan	884,780
Standing Rock	Sihasapa, Hunkpapa, Yanktonai	1,847,812
Total		2,824,736

OKLAHOMA

Reservation	*Tribes*	*Acres*
Cherokee	Cherokee	70,070
Chickasaw	Chickasaw	803,108
Choctaw	Choctaw	2,590,043
Creek	Creek, Uchee	72,813
Osage	Osage, Quapaw	404,924
Ottawa	Ottawa	1,587
Ponca	Ponca	320
Seminole	Seminole	4,854
Wichita	Caddo, Delaware, Kichai, Towakoni, Waco, Wichita	1,511,576
Wyandot	Wyandot	535
Total		5,459,830

NOTE. On allotted lands live the Arapaho, Cheyenne, Comanche, Iowa, Tonkawa, Kansas, Kickapoo, Kiowa, Modoc, Lipan, Oto, Missouri, Pawnee, Peoria, Shawnee, Quapaw, Seneca.

OREGON

Reservation	*Tribes*	*Acres*
Klamath	Klamath, Modoc, Piute, Pit River, Walpape	872,186
Silets	Alsea, Coquille, Kusan, Shasta, Siuslaw, Umpqua	3,200
Umatilla	Cayuse, Umatilla, Wallawalla	79,820
Warm Springs	Des Chutes, Piute, Warm Spring, Wasco	322,108
Total		1,277,314

SOUTH DAKOTA

Reservation	*Tribes*	*Acres*
Crow Creek	Yanktonai, Lower Brulé, Miniconjon, Two-Kettle	111,711
Cheyenne River	Blackfoot-Sioux, Miniconjon, Sans Arcs, Two-Kettle	2,467,926
Lower Brulé	Lower Brulé, Yanktonai	175,471
Pine Ridge	Ogallala, Cheyenne	1,943,121
Rosebud	Miniconjon, Ogallala, Two-Kettle, Upper Brulé, Wahzhazhe	1,524,210
Total		6,222,439

UTAH

Reservation	*Tribes*	*Acres*
Uinta Valley	Gosiute, Pavant, Uncompahgre, Uinta	179,194

WASHINGTON

Reservation	*Tribes*	*Acres*
Colville	Cœur d'Alène, Colville, Kalispel, Okinagan, Methow, Nespelim, Pend d'Oreille, Sanpoil, Spokan	1,297,009
Hoh River	Hoh	640
Lummi	Dwamish, Lummi, Snohomish	598

WASHINGTON — *Continued*

Reservation	*Tribes*	*Acres*
Makah	Makah, Quileute	23,040
Muckleshoot	Muckleshoot	169
Port Madison	Dwamish, Lummi, Snohomish, Swinamish	1,375
Osette	Makah	640
Quileute	Quileute	837
Quinaielt	Quinaielt	176,650
Shoalwater	Chihalis	335
Snohomish	Dwamish, Lummi, Snohomish	8,930
Yakima	Klikitat, Paloos, Topnish, Wasco, Yakima	837,753
Total		2,347,976

WISCONSIN

Reservation	*Tribes*	*Acres*
Lac Court Oreille	Ojibwa	20,096
Lac du Flambeau	Ojibwa	26,153
La Pointe	Ojibwa	46,613
Menominee	Menominee	231,680
Stockbridge	Stockbridge, Munsee	11,803
Total		336,345

WYOMING

Reservation	*Tribes*	*Acres*
Wind River	Arapaho, Shoshoni	95,307
GRAND TOTAL		48,477,216

See INDIAN AFFAIRS; INDIANS, AMERICAN; TREATIES, INDIAN.

INDIAN RIVER. A long shallow lagoon on the east coast of Florida, varying in width from 4 miles to a few hundred feet and extending along just inside the coast from lat. 28° 48′ N. about 107 miles in a southerly direction (Map: Florida, F 3). For about 17 miles south of Cape Canaveral to Jupiter Inlet, in many places it is separated from the ocean only by narrow strips of beach, which in two places is cut by inlets. Indian River Inlet is about 60 miles south of Cape Canaveral; this is navigable through a channel about 5 feet deep.

INDIAN RUNNER. See DUCK, and Plate of DUCKS.

INDIANS, AMERICAN. The name applied first by Columbus and his immediate successors to the natives of the newly discovered islands and mainland of America, under the mistaken impression that these regions were a part of the outlying coast of Asia. The name most frequently used by scientific writers, especially in Europe, is simply *American, American Indian,* or *American Races.*

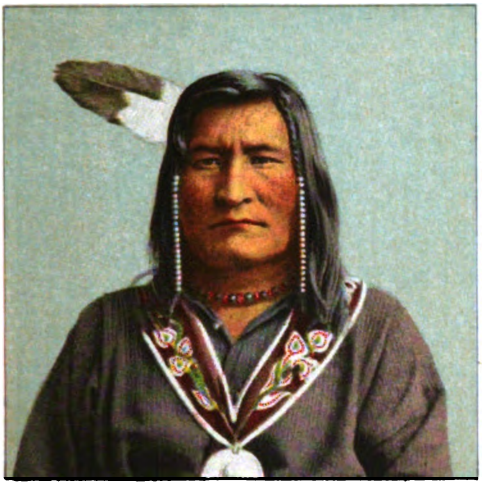
It is customary to classify the races in three ways—by language, physical type, and culture; and it is not until a given group of people has been characterized in these three aspects that their descriptive anthropology is regarded as known. The natives of both North and South America, however, present a great variety of linguistic, anatomical, and cultural characters, making it necessary to discuss them in groups and subdivisions. The best-known tribes are those of the United States and Canada, which we shall consider under one head, giving another section to Mexico and the Central American States and still another to South America. However, before proceeding with these divisions of our subject, we may note a few general points. Culturally the American race may be credited with decided individuality in the development of a few cultivated plants—maize, tobacco, peanuts, and cotton. On the other hand, they were weak in the domestication of animals, the dog being the only one of extensive distribution. They were also weak in navigation, for, though good canoeists, they did not develop sail vessels. While true bronze was developed in parts of South America, the race as a whole had made little progress in metals. Architecture existed only in the few specialized cultures of the south, where it reached an advanced stage, but is peculiar in the absence of the true arch. Basketry in the north and cloth in the south reached a high state of artistic perfection. Ritualistic religion was highly developed. The race as a whole showed a keen interest in natural phenomena, which, coupled with a poetic temperament, gives their mythology a highly symbolic character and a decided æsthetic charm. Perhaps this, more than anything else, has led to the extensive modern American use of Indian motives in art and literature.

The origin of so important a race must always be a matter of great interest. Though no definite solution to the problem has yet been attained, some progress has been made. The great linguistic diversity and independence seem to indicate a long period of isolation from the Old World. On the other hand positive evidence for the peopling of the Americas before the last Glacial period is wanting, necessitating the assumption that very little change has occurred in continental configuration since the Indian came. His ancestors must therefore have crossed from Asia to Alaska. Anatomically he resembles most closely the Mongolian and bears a striking resemblance to certain Siberian tribes. As may be inferred from the previous discussion, there is very little in American culture that can be directly connected with the Old World. A few things seem to have come from northern Asia—e.g., the sinew-backed bow—but they are unimportant. There are also some doubtful traces of Pacific Island culture in South America, but on the whole the cultures of the two hemispheres are so strikingly different that we must assume the crossing over to have been very long ago, while the cultures of Asia were exceedingly simple. These primitive folk must have spread over the entire New World, for the most advanced traits of American culture seem to have been developed later in two special centres, Central America and the middle Andean country of South America, from which cultivated plants, weaving of cloth, work in metals, painted pottery, etc., spread to other areas. The Eskimo, the numerous small stocks of the Pacific coast, in North America, and the Patagonians, Tierra del Fuegans, with many of the tribes on the Atlantic slope in South America, are now believed to represent in a degree the original cultures of the immigrant folk from the Old World, now surviving on the margins of the continents where they were pushed out by the more vigorous development of specialized cultures in the interior. During this long period, however, they have been so strongly influenced by environment and tribal contact that we are not justified in taking their cultures as we now find them as specific types of the original American culture, but can only infer simplicity and negative traits therefrom. See ARCHÆOLOGY, AMERICAN.

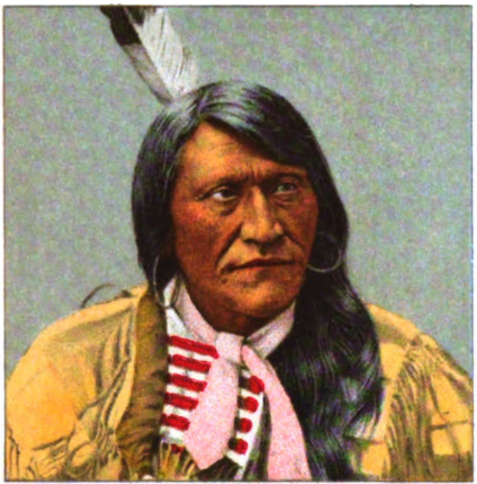
INDIANS OF THE UNITED STATES AND CANADA

According to the 1910 census there were living representatives of 280 Indian tribes in the various States, and in Alaska 21, with 45 additional Eskimoan tribes. No such complete enumeration of those in Canada is available;

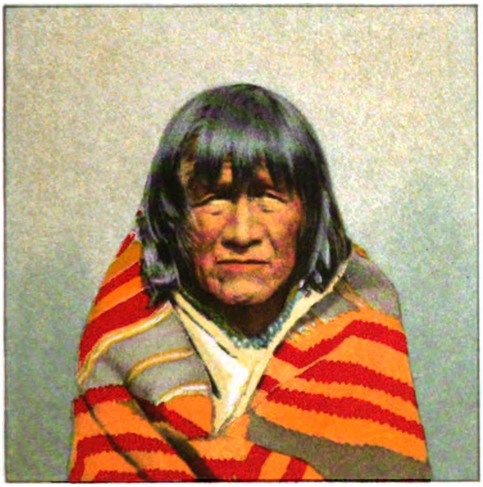
AMERICAN INDIANS



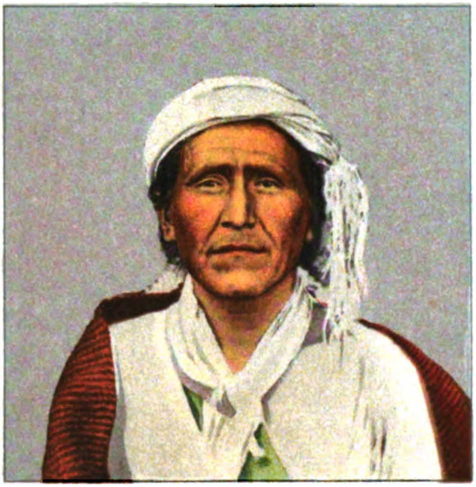
ES-SEN-CE or "LITTLE SHELL," ALGONKIAN FAMILY. OJIBWA TRIBE
A FOREST INDIAN



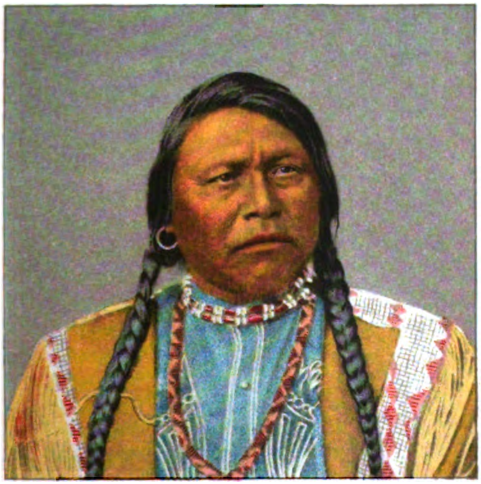
NOM-PA-A-PA or "TWO STRIKES," SIOUAN FAMILY. BRULÉ TRIBE
A PLAINS INDIAN



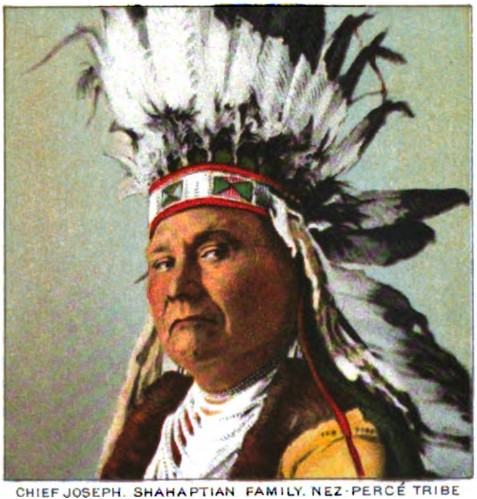
ARESO KERESAN FAMILY. COCHITI TRIBE
A PUEBLO INDIAN



A SHAMAN. ATHAPASCAN FAMILY. NAVAJO TRIBE
AN INDIAN OF THE ARID REGION



OURAY. SHOSHONEAN FAMILY. UTE TRIBE
A MOUNTAIN INDIAN



CHIEF JOSEPH. SHAHAPTIAN FAMILY. NEZ-PERCÉ TRIBE
A COLUMBIA RIVER INDIAN.

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but, exclusive of the Eskimo, they certainly equal half the number in the United States. When America was discovered, the number of tribes must have been greater, for many of those enumerated in Colonial literature are now extinct; but this seems only true of New England, eastern Canada, and a narrow belt along the Atlantic coast and the Gulf of Mexico. A few tribes in California and elsewhere have become extinct in historic times, but the number is insignificant. One hundred is quite a liberal estimate of the number extinct, so that, contrary to the popular opinion, scarcely one-fourth of the original number of tribes have been wiped out by the whites. Further, such extinction was often political rather than otherwise, in that the survivors were assimilated by a kindred tribe or even by the whites. That extinction was not due entirely to Colonial wars is clear from the fact that the process is still operative and will no doubt continue until citizenship and dispersion among the white population bring about complete loss of identity. There is also archæological and linguistic evidence of the rise and extinction of tribes in prehistoric times, when the white race could not have been a factor; but there have been very few instances of the formation of new tribes since the Colonial period.

This does not imply that the actual number of individuals has not greatly decreased. No satisfactory estimate of the Indian population in 1492 can be made. In 1910 the census enumerated 291,014 Indians for the United States and Alaska, which is about the count of the Indian Office in 1870, indicating approximate stability in population. The present estimate for Canada is 115,000. Thus, in round numbers the total present Indian population north of Mexico is 400,000. James Mooney, United States government expert, estimates the total population in 1492 at 1,115,000. The chief factors in the causes for modern stability are the prevalence of European diseases, especially tuberculosis, and the lack of sufficient food, which result in a very high death rate.

Intermarriage between Indians and whites still continues, but with other races scarcely at all. In the United States proper 33 per cent of the total number of Indians in 1910 were of mixed white descent, while of negro and other mixtures there were less than 3 per cent. In Alaska 15 per cent report white blood, which is also about the estimated proportion for Canada. The thirteenth census of the United States makes it clear that both the fecundity and vitality of mixed white marriages are higher than for the full-blood Indian, as also marriage among mixed bloods. If this tendency continues, the full-blood Indian is destined to disappear and the whole race to be wiped out by assimilation.

In almost every case the survivors of the various Indian tribes retain their original language and, in more or less completeness, their former culture, to which is due our extensive anthropological knowledge of American peoples. For more than 20 years they have been under investigation by the Bureau of Ethnology at Washington, the American Museum of Natural History in New York, the Field Museum of Natural History in Chicago, the University of California, and other institutions whose numerous publications constitute one of the most important sources of anthropological data in the world.

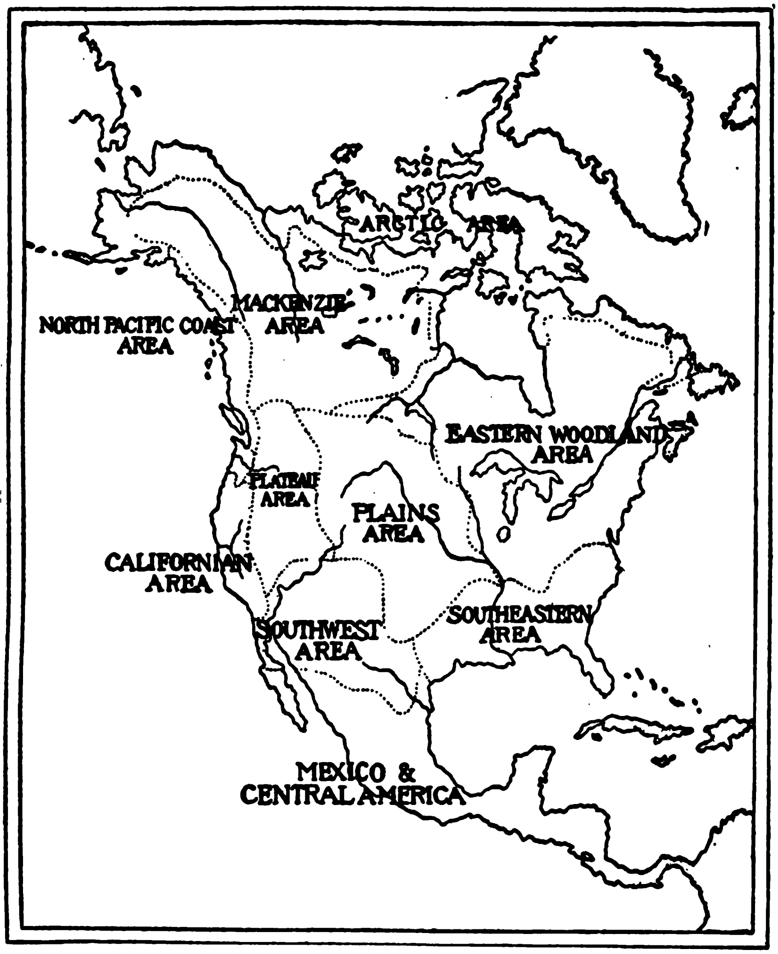
Culture Areas. The several tribes present varying forms of culture—some being quite identical, while others show all degrees of difference; hence it has been found desirable to group or classify them with respect to their customs and habits. Accordingly anthropologists recognize nine culture groups, which in a general way correspond to as many geographical areas, or culture areas. The approximate boundaries to these areas are indicated on the map on page 114. It should be noted, however, that the divisions on this map are relative rather than absolute, for rarely can a tribe be found anywhere that does not share in some measure the culture traits of all its immediate neighbors. Yet certain groups of tribes often have highly characteristic traits in common, whence they are said to be of the same general culture type. A culture area, therefore, does not imply absolute identity of tribal cultures, but agreement in most of the typical traits.

The Plains Area.—Geographically this area comprises the plains and prairies west of the Mississippi and was formerly the range of the largest herds of buffalo or bison. The typical plains culture is characterized by the following traits: buffalo hunting; the tepee (tipi); in historic times the use of the horse, formerly of the dog, with the travois; the camp circle; the soldier police; the sun dance and a highly individualistic geometric art. Woman's costume is also quite distinctive, as are the methods employed in dressing skins. The tribes having these traits in their most intense and exclusive form are the Assiniboin, Arapaho, Blackfoot, Crow, Cheyenne, Comanche, Gros Ventre, Kiowa, Sarsi, and Teton-Dakota. These tribes lived almost entirely upon buffalo meat, used the portable tepee, used skins instead of cloth, made no pottery, and did not practice agriculture. The horse was introduced from the Spanish settlements at an early date, probably before 1630, and reached the Blackfoot of the Far North before 1751, so that before their discovery by Europeans these tribes became nomadic horsemen. They also used dogs as beasts of burden, hitching them to A-shaped drag frames, or travois. A similar frame was later used for horses. This development of dog transportation suggests that these tribes were already nomadic hunters before the introduction of the horse.

Along the eastern border of the area lived the Arikara, Hidatsa, Iowa, Kansas, Mandan, Missouri, Omaha, Osage, Oto, Pawnee, Ponca, Santee-Dakota, and Wichita. These differed somewhat from the others in living in earth, mat, or grass covered houses in permanent villages, though using tepees when on the hunt; in the cultivation of small fields of corn (maize), the manufacture of pottery, and the limited weaving of baskets and bags. In most other respects they resembled the more typical tribes. To the northeast around Lake Winnipeg were the Plains-Cree and Plains-Ojibwa, divergent groups of larger divisions in the Eastern Woodland Area, and with a culture intermediate to the two areas. Again on the west are the Bannock, Nez Percé, Northern Shoshoni, Ute, and Wind River Shoshoni, who manifest some of the traits typical of the Plateau Area. Consult Clark Wissler, ***North American Indians of the Plains*** (New York, 1912).

The Eastern Woodland Area.—Geographically this area is a broad belt on either side of the Great Lakes, extending to the Atlantic Ocean.

Excepting the extreme western and northern borders, the entire area was forest. Recent investigations make it clear that this area is composed of several divisions, having much less in common than those of the preceding area. Thus, in the north between the Great Lakes and Hudson Bay and eastward, we have a subarctic forest in which range the Cree-Montagnais tribes, including the Naskapi of Labrador and the Northern Saultean west of James Bay. They live entirely by hunting and fishing, are quite nomadic, use a kind of tepee covered with bark or skins, the birch canoe, snowshoes, make no pottery, dress in skins, have a loose social organization and no complex ceremonies. They stand out in contrast to the remainder of the area in the absence of agriculture, pottery, and complex social, political, and ceremonial organizations. On the other hand, costume, folklore, certain religious concepts, and art seem to possess general similarities throughout. The Iroquois (q.v.) had a highly specialized form of this culture, as did the Delaware (q.v.) and Powhatan Confederacy (q.v.). The various New England tribes seem to have had certain decided individualities, though good data are lacking because of their almost entire extinction. On the southern borders of the Great Lakes is the Central Algonquian group; the Ojibwa, Menominee, Potawatami, Sauk (Sac), Fox, Kickapoo, Ottawa, and perhaps the almost extinct Illinois Confederacy (Piankishaw, Peoria, Kaskaskia, etc.). So far as the tribes of this Central Algonquian group have been studied, they may be characterized by intense clan organizations, highly developed religious concepts and ceremonies. Among the latter the most distinctive is the midewiwin (grand medicine society), a semisecret ritualistic order with four or more degrees, the purpose of which seems to be the preparation of the spirit for entrance into the "life after death." (Consult W. J. Hoffman in the *Seventh Annual Report of the Bureau of American Ethnology*, Washington, 1891.) As the name indicates, the tribes constituting this Central group are of Algonquian stock, but associated with them in culture are the Winnebago (q.v.) of Siouan stock.



CULTURE AREAS OF NORTH AMERICAN INDIANS.

Perhaps more than elsewhere, in this area this group made use of wild rice as a food. This grain was of great economic importance along the southern border of the Great Lakes and down the St. Lawrence, because of the climatic check upon agriculture. Its use is mentioned by French explorers, and the whole subject is fully treated by A. E. Jenks in the *Nineteenth Annual Report of the Bureau of American Ethnology* (Washington, 1900).

In the Plains Area we noted certain culture differences among the tribes on its eastern border; these differences are chiefly due to the intrusion of Central Algonquian traits, and likewise among the Central Algonquian we find some traits from the Plains, especially among the Winnebago and Illinois.

The Southeastern Area.—This area includes the States of Tennessee, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, with the adjoining parts of Arkansas and Texas. The principal tribes were the Atakapa, Alibamu, Apalachicola, Apalachee, Catawba, Cherokee, Croatan, Upper and Lower Creeks, Chickasaw, Choctaw, Caddo, Carrizo, Karankawa, Kichai, Koasati, Kusa, Natchez, Quapaw, Seminole, Tutelo, Tuscarora, Timuquanan, Tunican, Towakoni, Tonkawan, Waco, and Uchee. A few of these are now extinct. In culture a general uniformity prevailed in intense agriculture, permanent villages, complex political organizations, social grades and slavery, head deformation, good pottery, weaving of cloth to a limited extent, the ceremony of the Busk, etc. East of the Mississippi the blowgun was used for small game, apparently an intrusive trait from South America via the West Indies. Some of the tribes built mounds to serve as house foundations and monuments. We also find permanent buildings for housing religious objects or shrines, which are in a way primitive temples, though very simple in structure. In all these respects the tribes east of the Mississippi stand somewhat apart from those west and must be classed with the very highest types of Indian culture north of Mexico. The Natchez and their neighbors made very fine cloth of mulberry fibre, and all the eastern tribes were noted for their netted cloaks of turkey feathers. The Busk, or green-corn dance, is in many respects one of the most interesting of all Indian ceremonies, and in its simpler form found its way into parts of the Eastern Woodland Area and even into the Plains. The complete ceremony requires eight days and is characterized by the kindling of new fire, the renewal of garments, the cleansing of houses, etc.—in short, the renewal of everything. Also enemies were forgiven and all malefactors absolved of their crimes. The famous "black drink," a powerful emetic, was also used to purify the priests of the ceremony. The underlying conception of the whole procedure seems to be a general thanksgiving for the fruits of the harvest as represented in the maize.

Very little is known as to the culture of the Carrizo, Karankawa, Tonkawan, and Atakapa skirting the coast of Texas, except that they were less advanced than the other tribes of the area. Consult C. C. Jones, ***Antiquities of the Southern Indians*** (New York, 1873), and J. R. Swanton, ***Indian Tribes of the Lower Mississippi, etc.*** (Washington, 1911).

The Southwest Area.—This area comprises chiefly the States of Arizona and New Mexico with adjacent parts of Texas, Mexico, and California. It is a warm arid region, but well adapted to certain kinds of agriculture. In it we find many prehistoric remains, some of which are undoubtedly the work of tribes still living, while others are farther removed. (See ARCHÆOLOGY, AMERICAN; CLIFF DWELLER.) The historic tribes comprise the true Pueblos (the Hopi, Zuñi, Acoma, Laguna, Taos, Picuris, San Juan, Santa Clara, Cochiti, Jemez, Sia, Santa Anna, San Ildefonso, Pojoaque, Tesuque, Nambe, Santo Domingo, San Felipe, Sandia, and Isleta), the Navaho, Apache (Jicarilla, Mescalero, Tonto, Lipan, White Mountain, San Carlos, and Chiricahua), the Walapai, Havasupai, Chemehuevi, Mohave, Yavapai, Yuma, Cocopa, Maricopa, Pima, and Papago, all within the United States, and in addition certain Mexican tribes (the Opata, Chihuahua, Tarahumari, and others). In a general way we have here two types of culture, pueblo and nonpueblo. The pueblo dwellers are clearly distinguished by their type of village (see Plate to ZUÑI), but have many other cultural characters in common, as the use of the kiva (q.v.), kachina dances, altars and sacred corn meal, tilling of the fields and weaving of cloth by the men instead of the women, a clan system and clan ceremonies, the domestication of the turkey. The Hopi are best known for the highly individualized ceremony of the snake dance (q.v.), not found among the other Pueblos.

The nonpueblo, or more nomadic, tribes are far less uniform in culture, the Navaho being in many respects the most specialized. All without exception made some efforts to cultivate fields—the Apache least of all, the Pima the other extreme. The latter, in common with the Hopi and a few other Pueblos, raised cotton, when first observed by the Spanish. The Navaho (q.v.) are now best known for their flocks of sheep and woolen blankets, the knowledge of which they acquired from the Spanish settlers. With the possible exception of the Navaho, Mohave, and Yuma, the nonpueblo tribes are fine basket weavers, those of the Pima, Chemehuevi, Yavapai, and Apache being especially prized by collectors. All without exception made some pottery, though quite inferior in quality and decoration to that of the pueblo tribes. Likewise their social and political organization was much simpler and more like that of the Plains Area.

In general, it may be said that all the tribes of the Southwest cultivated corn, made pottery, conducted more or less complex masked dramatic ceremonies, and depended far less upon animal than upon vegetable foods. Among the nonpueblo tribes we find a high development of basket weaving and in later times extensive use of the horse by the Navaho, Apache, and Papago; among the pueblo tribes, a high type of masonry, pottery, cotton cloth, masked ceremonies, and complex social organization. Consult P. E. Goddard, ***Indians of the Southwest*** (New York, 1913).

The Californian Area.—This area includes all of the State of California, except the extreme southeastern part, and a portion of southwestern Oregon. Within its bounds are found representatives of more linguistic stocks than in any other area and, in proportion to its size, a greater number of tribes. There are 21 of these stocks, all but three of which are not represented elsewhere; they are the Athapascan, Chimarikan, Chimmesyan, Costanoan, Esselenian, Karok (Quoratean), Lutuamian, Maidu, Miwok (Moquelumnan), Pomo (Kulanapan), Salinan, Shastan, Shoshonean, Washoan, Wintun (Copehan), Wiyat (Wishoskan), Yanan, Yokuts (Mariposan), Yukian, Yurok (Weitspekan), and Yuman. These stocks are each represented by one or more small tribes. In contrast to this great diversity of ethnic groups there seems to have been very little migration or tribal differentiation within historic times, for even migration traditions are wanting, each group residing in its traditional habitat, suggesting that their distribution must have occurred at a remote period. There is also decided cultural uniformity. One of the striking characteristics is the almost entire absence of political organization, the small villages being the units, with the only bonds between them those of language and topography.

California culture was perhaps the crudest and simplest type to be found in America. Though the art of basketry was highly developed, perhaps superior to the basketry of other areas, other arts were quite primitive. Pottery was practically unknown, agriculture was nowhere practiced, though the chief food was vegetable. The acorn was the great staple, from which was produced a kind of meal, and in turn a bread. The seeds of wild grasses and roots were also used. Hunting of deer and small game and fishing were supplementary. Social organization was little more than the family unit, and while ceremonies were in some respects elaborate, they did not possess the complex rituals of other areas.

Certain minor cultural differences between the northern and southern parts of the State seem due to intrusive traits. For example, in the extreme north we find some rectangular houses of native planks, like those of the South Pacific Area. However, these differences are far less accentuated than those marking off the subdivisions in the culture areas so far discussed. Consult A. L. Kroeber, *Types of Indian Culture in California* (Berkeley, 1904), and id., *Religion of the Indians of California* (ib., 1907).

The North Pacific Coast Area.—From southern Oregon to the Alaska Peninsula we have a long stretch of country between the Pacific Ocean and the western slopes of the Cascade Range. In the south we have rather level open tracts, but in the north rocky coasts with deep valleys. The Indians throughout this long coast belt had many similar traits of culture. In the first place they were accomplished canoeists and fishermen. Their country was heavily timbered, in consequence of which we find work in wood highly developed. Especially in the north we find large rectangular houses of split planks, with picturesquely carved posts and totem poles (see TOTEMISM). Dishes, bowls, and spoons were of wood. No pottery was made, so boiling was in wooden boxes and baskets by dropping in hot stones. No food plants were cultivated, but in a few localities some tobacco was planted. Costume was simple. A large woven umbrella-like hat was worn in rainy weather; the feet and legs were usually bare, and excepting a kind of cloak or mantle there was little in the way of body clothing. The social organization was rather complex, some of the tribes having not only numerous clans but also phratries. Each clan, or family, had a body of tradition and ceremonies, some aspects of which were objectified in the form of "crests," carved upon totem poles and house fronts. Society consisted of at least four grades —chiefs, nobility, citizens, and slaves. More than elsewhere in North America the sense of wealth was developed with extensive barter and forms of credit. As a part of this credit system, we have the famous potlatch celebration, which is in the main a conventional display of family riches. There are many religious societies, all of which have rather complex rituals.

The most typical tribes of this area are the Tlinkit, Haida, and Tsimshian of the north; next in order are the Kwakiutl, Nootka, and Bella Coola. In Washington and Oregon are the still less typical coast Salish (q.v.), the Chinook, and other small tribes. Consult A. P. Niblack, "Coast Indians of Southern Alaska and Northern British Columbia," in *Report of the United States National Museum for 1888* (Washington, 1889), and Franz Boas, *Tribes of the North Pacific Coast* (Toronto, 1906).

The Plateau Area.—As the name indicates, this comprises the highlands in Nevada, Utah, Idaho, Oregon, Washington, and British Columbia—a region in which the geographical conditions vary from the arid south to the rather mild forested north. However, almost the entire native population was found in the northern half. In the deserts of Utah and Nevada were scattered bands of the Gosiute, Pavant, and Piute, but from the Snake River northward were the Bannock, Snakes, Nez Percé, all the interior Salishian tribes, and the Kutenai. Their combined ranges covered the drainage of the Columbia River, which brought them into the great salmon area. This fish furnished the chief food, though the Snakes and Nez Percé made some use of the buffalo, the Salish of the north of the deer and bear. Vegetable foods, however, made up a large part of their menu, especially wild-grass seeds, roots, and berries. Pottery was unknown, except possibly to a few of the southern tribes; but basketry was highly developed, and some weaving of bark fibres was attempted. Cooking was in baskets and pits with hot stones. An underground house was used in the north, a brush shelter in the south. Social organization and ceremonies were relatively simple, though less so than those of California. Some of the tribes on the east, as the Nez Percé, Bannock, Flathead, and Kutenai, borrowed many traits from the Indians of the plains, while others on the west borrowed from the coast tribes. Consult A. B. Lewis, *Tribes of the Columbia Valley and the Coast of Washington and Oregon* (Lancaster, Pa., 1906).

The Mackenzie Area.—As may be seen from the map, this area comprises the Great Northwest, or the interior of northwestern Canada and Alaska. Unlike the preceding areas, its native inhabitants are of a single linguistic stock, Athapascan, passing under the general designation of Déné (see ATHAPASCAN STOCK). Part of the area is mountainous and part subarctic. The winters are long and the conditions of life hard, perhaps even more so in the north than for the Eskimo, who live on sea food. In all these respects the environment is similar to that of the Cree and other extreme northerly tribes of the Eastern Woodland Area. The increasing severity of the climate from south to north naturally modifies the culture of the natives, which in Alaska and the Far North becomes generally similar to the Eskimo. Yet considerable uniformity prevails. We find a loose social and political organization, the unit being the band, or family group. For food the chief dependence is on the caribou, whose skins also furnish clothing and tents. Toboggans, snowshoes, and bark canoes are in general use. Utensils are of basketry and bark, and boiling is usually with hot stones. The chief tribal divisions are the Kutchin, Loucheux, Hares, Slavey, Dog-Ribs, Copper-Knives, Chippewayan, Beaver, Carriers, Nahane, Sekanie, and Babine. Consult Samuel Hearne, *Journey to the Northern Ocean* (London, 1795), and A. G. Morice, "Notes on the Western Dénés," in *Transactions of the Canadian Institute*, vol. iv (Toronto, 1895).

The Arctic Area.—The territory included in this area is a narrow strip along the entire coast from the Alaska Peninsula to the Gulf of St. Lawrence, the Aleutian Islands, and all the inhabited Arctic lands between Banks Land and Greenland inclusive. It is occupied by tribes of the Eskimoan stock, whose culture has been discussed under the title ESKIMO.

General Cultural Characters. In conclusion, a few general points may be noted. As to foods, there is a tendency to make one food the main support for a considerable area; thus, maize, or corn, was the one important staple for the Pueblo Indians of the Southwest, all other foods being supplementary; in California it was the acorn; in parts of the Plateau Area, the seeds of wild grasses were important; in the southeastern and the southern two-thirds of the Eastern Woodland areas, maize, with wild rice along the northern border of the maize area. In the Mackenzie Area, the North Pacific Coast, the Eskimo country, and parts of the Plains Area, vegetable foods were a negligible factor. Of animal food, the typical Indians of the Plains depended upon the buffalo almost as completely as the Eskimo upon seals and caribou; the tribes of the Columbia drainage and northward depended upon salmon, and those of the Mackenzie Area, together with those in the extreme north of the Eastern Woodland, upon animals of the deer kind: of manufactured foods, chiefly those of pulverization—maize where grown, acorns in California, grass seeds and roots in the Plateau Area, even berries in parts of the Plains and Mackenzie areas. This process was also applied to animal food—as buffalo pemmican in the Plains, deer pemmican in the Eastern Woodland and parts of the Mackenzie Area, and in parts of the salmon area where the dried fish were pounded fine and stored. Another unique product is the maple sugar of the Eastern Woodland. The smoking of tobacco or other vegetable substances was associated with religious and social concepts among the Plains, Southeastern, Eastern Woodland, and adjacent parts of the Plateau and Mackenzie areas; while not unknown elsewhere, it was of minor importance. Tobacco was cultivated in the eastern part of the continent and by a few tribes along the Missouri and Columbia, not otherwise agricultural. Fishing was rare in the Plains and the Southwest, but common elsewhere.

The moccasin was worn in the Plains, Southeastern, Eastern Woodland, parts of the Mackenzie, Plateau, and Southwest areas. Many of the Indians of California and the North Pacific Coast went barefoot. The Eskimo and tribes of the extreme North wore boots. Nowhere except in the extreme North and Southwest was a hat or other head covering used as regular dress. Clothing was made of skins, except in parts of the North Pacific Coast Area and the Southwest. California, Plateau, North Pacific Coast areas, and part of the Mackenzie Area were the "stone boiling" region; i.e., food was boiled in baskets or boxes by dropping in hot stones. Aside from a limited use of hammered copper in a few localities, metals were unknown. Individual ownership of land was rare.

Slavery was a regular institution on the Pacific coast from Alaska to California, the slaves being prisoners of war, their children and descendants, who thus constituted a permanent slave caste within the tribe, condemned to hard labor, harsh treatment, sale, or death at the will of their masters. Slavery of a milder type seems to have existed among the South Atlantic tribes. In more modern times the Southern Indians followed the example of the colonists and became the owners of negro slaves.

Woman, while subject to her husband in ordinary affairs and debarred from certain societies and ceremonies, had yet well-defined rights of her own. She was complete mistress in household affairs, and among the Eastern tribes had either a voice or a representation in councils. With the Iroquois all important questions must be passed upon by a council of the women, who alone had power to declare war. The right of adoption, which meant the decision of a captive's fate, rested also with the women. In general her position was highest in those tribes where descent and inheritance were reckoned in the female line. In the division of labor most of the heavy work fell to her share, while the dangerous and arduous undertakings belonged to the man. Polygamy was recognized in most of the tribes.

The method of disposing of the dead varied, but was usually inhumation. Graves or pits were common throughout the greater part of the Southeastern and Eastern Woodland areas; scaffold burial was found in the Plains, and elevated canoe burial in parts of Washington and Oregon; cremation was the usual method in California and parts of the Southwest; elsewhere the body was placed upon the ground, variously protected. Thus, east of the Mississippi we have burial in the ground; in the remainder of the continent the body was usually placed on or above the surface.

Not all Indians were fond of war. The most warlike were those of the Plains and east of the Mississippi. Those of California and the Pueblos of the Southwest were least inclined to war. Among the former social position depended upon war deeds, but elsewhere in the continent they were of less importance.

Among extreme Northern tribes the principal weapons were the knife, club, and lance. To these were added farther south the bow and arrow and the hatchet or tomahawk. The bow and arrow were practically universal, but the lance and shield as a rule were used only by the equestrian tribes of the open plains and the desert Southwest, the timber people finding them a hindrance to active movement. Aside from the shield, defensive armor was not commonly used, excepting among tribes of the Alaskan coast, who had protective cuirasses of ivory plates, wooden slats, or of a very tough hide.

Service in any particular expedition was entirely a matter of individual choice, and the authority of the leader rested solely upon the voluntary obedience of his followers. On the plains the invitation was usually given by sending around a war pipe, which every volunteer was expected to smoke. The going and the homecoming were attended with numerous ceremonies, and a successful campaign was celebrated with the scalp dance, in which the women carried the captured scalps and sang the praises of the victors.

Indiscriminate massacre was the ordinary rule; but prisoners were frequently taken, either for torture, slavery, or adoption. If adopted, the prisoner was taken into a family and became a full member of the tribe. If condemned to death, he met his fate with all the courage of his Indian training. On the plains captives were seldom tortured, but were more often taken into the tribe, being rarely, however, so completely admitted to membership as in the East. The practice of scalping the slain enemy was far from universal. In many tribes it was customary to feast upon the flesh of one of the slain enemy after a notable victory. However, all the native methods of fighting were greatly modified by the early introduction of guns and from experience with European antagonists.

The leisure of the Indian was taken up with athletic contests, games, dances, feasts, and story-telling. The ball play was the chief athletic game everywhere east of the plains, as well as among some tribes of the Pacific coast, the ball being handled with netted sticks somewhat resembling tennis rackets. From this game are derived the lacrosse and racquet of Canada and Louisiana. Next in importance in the East was the game known to the old traders as *chunky*, played with a circular stone disk or wheel and a pole curved at one end in the fashion of a shepherd's crook. The wheel was rolled by one of the contestants, while the other tried to slide the stick after it in such a way that the wheel would lie within the crook when both came to a stop. The plains tribes had a very similar game in which a netted wheel took the place of the stone disk. Foot-racing was common among the agricultural tribes and horse racing on the plains. Dice games were universal.

A favorite pastime of the plains women was the awl game, played with marked sticks which were thrown down upon a stone set in the middle of a blanket, tally being kept by advancing an awl along certain marks around the margin of the blanket. Shinny and football were also played by the women. Hunt-the-button games were played within the tepee during the long winter nights, the players accompanying the movements of the hands with songs intended to distract the attention of the other side.

Social dances, usually followed by feasting, were of great variety.

Musical instruments were the drum, flageolet or flute, eagle-bone whistle, rattles of various kinds, and even a notched stick rubbed in saw fashion with one end resting upon a gourd for a sounding board. There were songs for every occasion—lullaby, work, love, gaming, medicine, war, and ceremonials. See INDIAN MUSIC.

To most of the Indians every animal, plant, and object of nature was animated by a spirit, beneficent or otherwise, according as it was propitiated or offended. Certain of these were regarded as especially powerful or active, as the sun, fire, and water among the elemental gods, the buffalo, eagle, and rattlesnake among the animals, and the cedar, cottonwood, corn, tobacco, and peyote among plants. The number four was peculiarly sacred, as having reference to the cardinal points. Colors had symbolic meanings and sometimes also sex and local abiding places. Thus, with the Cherokee the red gods of victory lived in the Sunland, or east, while the blue spirits of disaster dwelt in the north. Spirits were propitiated and implored with prayer, sacrifice, vigil, and fasting, and the purificatory sweat bath usually preceded every important ceremony. There was no overruling "Great Spirit," excepting as certain gods were of more frequent importance than others. Among the plains Indians the spirit buffalo was all-important, while with the agricultural tribes of the Southwest the rain gods took precedence. The sun and its earthly representative, fire, were everywhere venerated. Certain tribes had tribal "medicine" or palladiums, with which the nation's prosperity was supposed to be bound up and around which centred their most elaborate ceremonial. Thus, the Kiowa had their Taime image of stone, the Cheyenne their sacred arrows, the Arapaho their "flat pipe." Each man had also his own secret personal medicine.

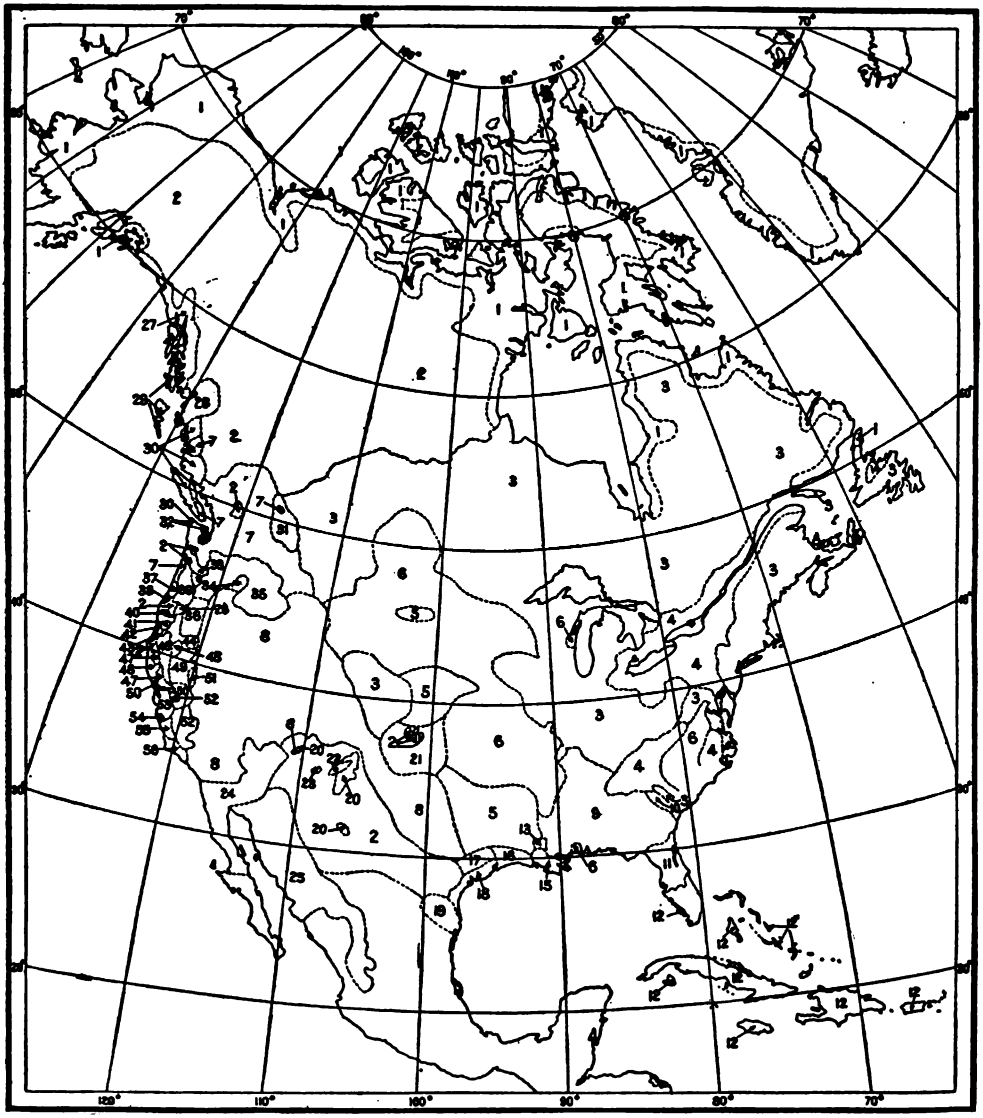
The priests were frequently organized into cult societies, and there were also brotherhoods bound together by certain secret rites. Great stress was laid upon dreams and sacrifice. Almost everywhere all religious sanctions and even detailed ceremonies are believed to have been handed down in dreams. Among the Pawnee, in former times, a captive girl was annually sacrificed to the goddess of fertility. The cannibalistic practices of the Eastern tribes after a victory, and the cannibal feasts of the Northwest coast, in which a slave was the usual victim, were also more or less sacrificial in motive. With these exceptions human sacrifice was rare, such bloody rites as those of the Aztecs being unknown in the North. There were special ceremonies for girls at puberty, and for young men on first taking rank with the warriors. Among the great religious ceremonials may be noted the green-corn dance of thanksgiving for the new crops, among the Eastern tribes; the sun dance and the more recent ghost dance of the plains tribes; the salmon dance of the Columbia region, and the celebrated snake dance of the Hopi of Arizona. To these may be added the peyote cult of the Southern plains. Tribal religions were sometimes subject to revival or revolution as new prophets arose from time to time. Thus, the religion of the ghost dance, which has practically superseded the old beliefs and ceremonial forms of the plains tribes, had its origin in Nevada towards the end of the nineteenth century. (See WOVOKA.)

Each tribe had its genesis tradition and its culture hero—usually a great trickster and frequently an anthropomorphic animal—together with giants, dwarfs, fairies, witches, and various monsters, as well as animal tribes and chiefs, concerning all of whom there was a great deal of myth and folklore.

Language. The first attempt at classifying the North American languages was made by Albert Gallatin in 1836, the relationships being established chiefly by a comparison of word roots. The beginning of regular systematic research dates from the establishment of the Bureau of Ethnology, under Major J. W. Powell, in 1879. The number of linguistic stocks north of Mexico, as at present recognized, is 56, as given in the tabulated list on page 120. While it is possible that further study may reduce this number, such reduction is highly improbable except in case of a very few minor stocks.

Some tribes had made fairly successful attempts at recording their history and mythic traditions by means of pictographs. Of these the best known are the Walam Olum of the Delaware, and the Kiowa calendars. Intertribal compacts were commemorated among the Eastern tribes by means of symbolic wampum belts.

The Cherokee alone had a literature recorded in an alphabet of their own invention. No accurate estimate of the number of distinct languages making up these stocks can be formed, but they probably exceed 200. To this should be added the dialects of all degrees of divergence to even a greater number. Among so many forms of speech we must expect great variety in structure, yet there are certain characteristics that serve to distinguish American languages as a whole. Of these, the most important are great complexity of grammar, because to a much greater degree than among the languages of other parts of the world American languages express ideas by grammatical processes instead of additional words; the expression of new ideas by affixes or even stem modification; rare use of gender for sex differentiation, the usual distinction of objects being animate and inanimate, good and bad, round and flat, etc.; and rarity of the plural even in the pronoun, its place being taken by ideas of collectivity and distribution. While there are other differences, these are the most obvious. Within the continent itself the 56 stocks enumerated in the table may be grouped according to certain special characteristics, which, however, show a tendency to conform to geographical areas and are therefore most likely due to historic contact.



MAP SHOWING THE LOCATION OF THE LINGUISTIC STOCKS OF NORTH AMERICA.

Another point of interest is the distribution of these 56 stocks. Their great number in California has been noted, but if we take the whole Pacific coast belt we find in all 36 stocks. Again, we note that of the 20 remaining, 9 are small stocks skirting the Gulf and the Atlantic. The causes of this distribution have been the objects of much speculation, but so far nothing positive can be stated.

This diversity of language was a bar to political and social unity, but did not prevent all intertribal communication. It was usual for some member of a tribe to learn the languages of neighboring tribes, some of which became by general consent the intertribal speech for their respective areas. In the Plains Area a peculiar sign language was developed to such a degree that it served all purposes. While this language seems to have been prehistoric, the well-known trade jargons were developed under the influence of European traders. See MOBILIAN TRADE LANGUAGE; CHINOOK JARGON.

The map on page 119 and the table on this page show the number and location of the North American linguistic stocks.

	LINGUISTIC STOCKS	POPULATION	
		United States	Canada
3	Algonquian	40,975	50,000
12	Arawakan	.....	.....
2	Athapascan	34,322	18,890
16	Attacapan	.....	.....
14	Beothukan	.....	.....
5	Caddoan	1,863	.....
32	Chimakuan	306	.....
26	Chimarikan	31	.....
28	Chimmesyan (Tsimshian)	729	1,375
33	Chinookan	897	.....
15	Chitimachan	69	.....
56	Chumashan	38	.....
19	Coahuiltecan	.....	.....
33	Costanoan	17	.....
1	Eskimoan (Eskimo)	14,087	19,000
54	Esselenian	.....	.....
29	Haidan (Skittagetan)	561	400
4	Iroquoian	39,679	10,481
39	Kalapuyan	106	.....
18	Karankawan	.....	.....
41	Karok (Quoratean)	775	.....
22	Keresan	4,027	.....
21	Kiowan	1,126	.....
38	Kusan	93	.....
31	Kutenaian (Kitunahan)	538	553
36	Lutuamian	978	.....
49	Maidu (Pujunan)	1,100	.....
50	Miwok (Moquelumnan)	699	.....
9	Muskhogean	29,191	.....
25	Piman	8,607	.....
48	Pomo (Kulanapan)	1,193	.....
55	Salinan	16	.....
7	Salishan	7,833	10,264
35	Shahaptian	4,391	.....
44	Shastan	1,578	.....
8	Shoshonean	16,842	.....
6	Siouan	32,941	7,860
40	Takelman (Takilman)	1	.....
20	Tanoan	3,140	.....
11	Timuquanan	.....	.....
27	Tlinkit (Koluschan)	4,458	.....
13	Tonikan (Tunican)	43	.....
17	Tonkawan	42	.....
34	Waiilatpuan	329	.....
30	Wakashan	388	4,150
51	Washoan	819	.....
46	Wintun (Copehan)	710	.....
43	Wiyat (Wishoskan)	152	.....
37	Yakonan	55	.....
45	Yanan	39	.....
52	Yokuts (Mariposan)	553	.....
10	Yuchean (Uchean)	78	.....
47	Yukian	198	.....
24	Yuman	4,279	.....
42	Yurok (Weitspekan)	668	.....
23	Zuñian	1,667	.....

Anatomical Characteristics. In the first place, there is quite an obvious difference between the Eskimo (q.v.) and the Indian of the United States, though this difference becomes far less certain in Alaska and parts of Canada where mixture has occurred. Taking the Indians of the United States and Canada as a whole, we find them conforming to the general American type of straight black hair, chocolate-brown skin, prominent cheek bones, and tall stature. The forms of face and head differ greatly, but show tendencies to geographical rather than to linguistic or cultural distributions. Thus, low statures tend to prevail throughout the entire Pacific Coast and Plateau regions and again in the Southeastern Area, while the several types of cranial form are distributed less regularly. (Consult W. Z. Ripley, *The Races of Europe*, Boston, 1900.) Anatomical studies of the living Indians have, however, not advanced far enough for a definite classification of the various tribes, and, even if they had, it is doubtful if such grouping would have any particular significance. The various tribes show differences of feature and limb analogous to family characteristics among us, which are often so marked among small tribes that an experienced observer can identify typical individuals by this criterion alone.

INDIANS OF MEXICO, CENTRAL AMERICA, AND WEST INDIES

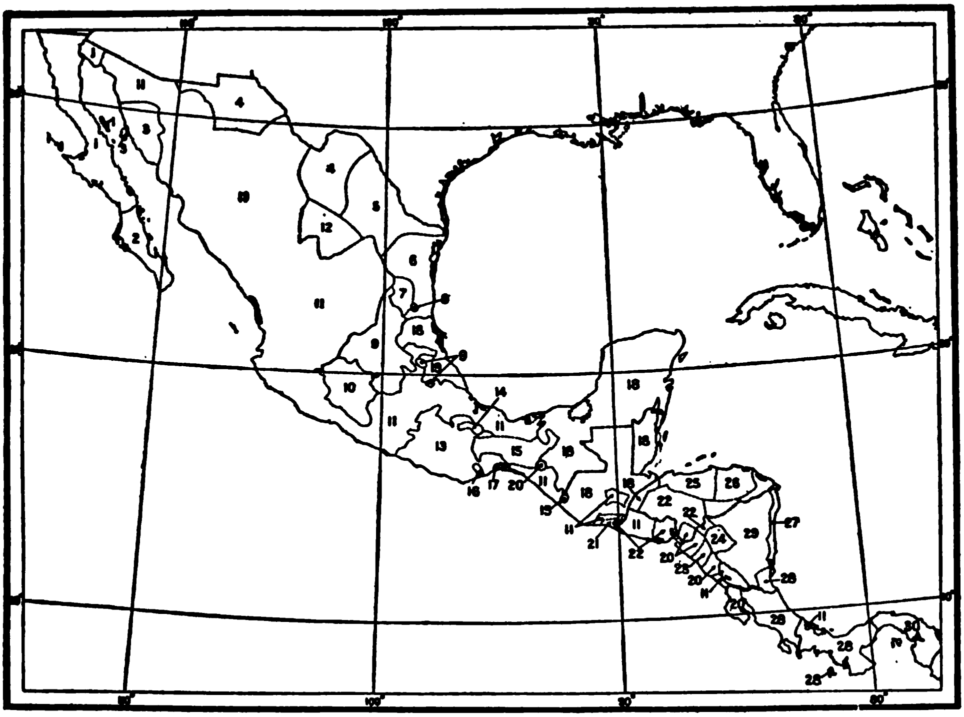
The tribes of Mexico and Central America exhibited every stage of culture from the brutish Cochimí and wild Guatuso to the civilized Maya, Tarasco, or Aztec, with their highly developed agriculture, architecture, and literature. From the Rio Grande to Panama some 30 linguistic stocks were represented, besides the Arawakan and Cariban tribes of the West Indies. From traditional and other evidence nearly all of the more important tribes of Mexico and Guatemala, including those of Piman, Nahuatlan, and Mayan stock, appear to have migrated from the north. The Otomí and Chinantec, however, appear to have antedated this movement and may properly be considered indigenous. There are shadowy traditions of earlier cultivated races, the Ulmec and Toltec, from whom the ruder Aztec acquired their first civilization, but it is difficult to decide whether these names belong to the domain of history or of myth. The roving tribes of the northern frontier seem to have been akin to the Apache, but have now so completely disappeared that even their affinity is not certainly established. The Comanche and Kiowa, as well as the Apache, made constant inroads from the north, penetrating as far down as Zacatecas. The destruction of the peaceable Carrizo tribes of the lower Rio Grande is chiefly due to these raids.

The tribes of the California peninsula, apparently of Yuman stock, were quite primitive. The Seri of Tiburon Island in the adjacent gulf were but slightly higher in the scale, but earned respect by their determined defense of their territory against all intruders. Their southern neighbors, the Yaqui, were as much noted for their fighting qualities as for their superior industry and reliability. The Tarumari and other Piman tribes of the Sierra Madre, as far south as Jalisco, differ but little in general habit of life from the northern Pueblos. Physically they are dark and rather undersized. The Otomí of the central plateau were but little inferior in culture to the Aztec, by whom they had been subjected.

The Nahuatlan tribes which constituted the nucleus of the ancient Aztec Empire dwelt chiefly in the present states of Mexico and Puebla, the Aztec proper having their capital on the site of the present city of Mexico. Detached offshoots of the same stock were found as far south as Costa Rica. The Empire included many tribes or nations of diverse stocks; but not all the cognate Nahuatlan tribes, even in the central territory, were under the rule of the Aztec, their bitterest enemies in fact being their neighbors and kinsmen, the Tlascaltec.

By reason of their military importance the Aztec have been somewhat overrated. Their general culture, while high in itself, was not superior to that of the Tarasco or Zapotec and was inferior to that of the Maya. In their social organization they had passed the matriarchal stage and reckoned descent and inheritance in the male line. The national prosperity rested upon agriculture. Land belonged to the clan, and marriage was regulated by gentile laws. In architecture they had reached a high stage of advancement, the pyramid of hewn stone being one of the most characteristic features. They knew the secret of bronze, and were skillful exacted as an annual tribute from the conquered tribes. The characters were iconomatic, or partly ideographic, partly phonetic, upon the principle of the rebus. Their calendar recognized 365 days in the year.

In southern Mexico were the Tarasco, Totonaco, Zapotec, and Mixtec, all populous and civilized nations equal in culture to the Aztec, if not superior. They built houses of cut stone, brick, and mortar, planted fields and orchards, worked gold and copper—the Tarasco wearing complete body armor of wood plated with copper or gold—made beautiful inlaid pottery, and wove cotton garments and robes of bright-colored feathers. They had elaborate ritual religions, accompanied sometimes by human sacrifice, with calendar systems and hieroglyphic literatures



MAP SHOWING THE LOCATION OF THE LINGUISTIC STOCKS OF MEXICO AND CENTRAL AMERICA.

1 Yuman
2 Waicurian
3 Serian
4 Athapascan
5 Pakawan
6 Tamaulipecan
7 Janambrian
8 Olivean
9 Otomian
10 Tarascan
11 Nahuatlan
12 Laguneros
13 Zapotecan
14 Chinantecan
15 Zoquean
16 Tequistlatecan
17 Huavean
18 Mayan
19 Totonacan
20 Chiapanecan
21 Jincan
22 Lencan
23 Subtiaban
24 Matagalpan
25 Jicaquean
26 Payan
27 Mosquitoan
28 Chibchan
29 Ulvan
30 Cunan

workers in gold and copper; but stone implements continued in common use, particularly obsidian for cutting purposes. Their dress was of native cotton, woven and dyed in brilliant colors. They had an extensive pantheon with orders of priests and priestesses, and a ritual ceremonial, impressive but cruel and bloodthirsty in character, thousands of human victims being annually sacrificed to the god of war, and their flesh afterward eaten by the multitude. Children of the higher classes were educated in public schools, where boys studied military science, writing, history, and religion, and girls were taught cooking, household work, weaving, and morals. There was a large native literature preserved in books written upon parchment or maguey paper, 24,000 bundles of this fibre being like those of the Aztec tribes. The Totonaco, who practiced circumcision and head-flattening, claimed to have built the pyramid ruins of Teotihuacan, a few miles northwest from the city of Mexico. The wonderful ruins of Mitla are claimed by the Zapotec.

Passing by the ruder Zoque, Mixe, and Chinantec, and the more advanced Chiapanec, in Oaxaca and Chiapas, we enter the territory of the highly civilized Mayan tribes, who held the whole peninsula of Yucatàn, with large portions of Tabasco and Chiapas and most of Guatemala, and had an outlying colony in the Huastec of Vera Cruz. Their principal nations, besides the Maya proper in Yucatan, were the Quiche and Cakchiquel of Guatemala. There is evidence that the ancient builders of Palenque and Copan, already in ruins at the time of the conquest, were of the same stock. The Maya proper had at one time formed a powerful confederacy, which, however, had broken up into a number of independent states before the arrival of the Spaniards, by whom they were conquered in detail, the last free remnant being driven from their citadel of Chan Santa Cruz by Mexican troops only as late as 1900, after a stubbornly contested war of several years. The great cities Mayapan, Uxmal, and Chichén-itzá, in ruins when first discovered, were once flourishing centres of dense populations, which had attained the highest point of native American civilization. In government they retained a modified clan system, with an hereditary chief ruler, assisted by a council from his own clan. They were preëminent in architecture, building palaces, pyramids, and cities of cut and polished limestone, set in mortar and covered with figures and hieroglyphic inscriptions. Strange as it must seem, all this was done without metal tools, gold and copper being used only for ornamental purposes. Agriculture was the principal industry, the common lands being portioned out by the village chiefs. Honey and wax were obtained from domesticated bees, and an active commerce was carried on by sea along the southern Gulf coast as far as the island of Cuba, copper disks and cacao beans being used as currency. Their intricate calendar, with its cycles of 20, 52, and 260 years, has been the subject of much scholarly interest, as also their remarkable hieroglyphic records, written upon parchment or maguey paper, or carved or painted upon the walls of their ruined cities, and for which as yet there is no interpreter. The cognate Cakchiquel and Quiche were similar to the Maya in culture, differing only in dialect and extent of territory and influence. The great *Popol Vuh*, a native compendium of the ancient mythology and history of the Quiche, translated by Brasseur de Bourbourg, has been characterized as "one of the most valuable monuments of ancient American literature."

Honduras, Salvador, Nicaragua, and Upper Costa Rica were occupied by tribes of different stocks, some of them of considerable advancement, others, particularly along the east coast, mere savages. The Xinca, on the Guatemala-Salvador frontier, are believed to have been a remnant of the pre-Mayan tribes. The Carib, on the Honduras coast, were exiles from the Antilles. The Mosquito, Ulva, and Rama, farther south along or near the coast, were all wild tribes of different degrees of savagery. The Ulva also have the custom of head-flattening. The Guatuso of northern Costa Rica were an agricultural but brave and savage people, now near extermination, owing to the cruelties of the rubber gatherers. South of their territory were found tribes of higher culture grade, the northern outposts of the civilized Chibchan tribes of Colombia.

The whole of the West Indies, with the exception of a possible Tupí colony from Brazil in central Haiti, was held by tribes of the two great South American stocks, Arawakan and Cariban, the former being indigenous, while the latter were recently invaders, who at the time of the discovery had as yet colonized only the southern islands. The Arawakan tribes were peaceful and agricultural, skillful weavers, wood carvers, and stone polishers.

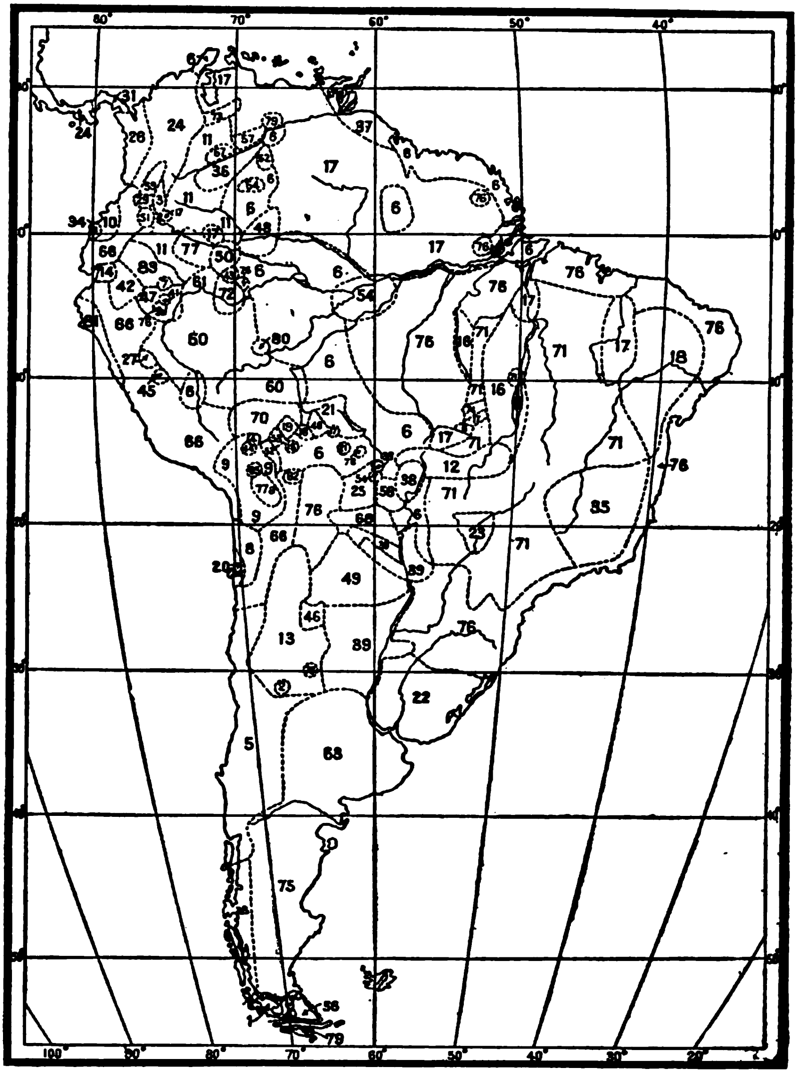
On page 121 are given a map and a list of the linguistic stocks of Mexico and Central America, so far as it is possible to classify them. Consult: H. H. Bancroft, *The Native Races of the Pacific States* (5 vols., New York, 1875-82); A. P. Maudslay, *Biologia Centrali-Americana* (London, 1889); W. H. Holmes, *Archeological Studies among the Ancient Cities of Mexico* (Field Columbian Museum Publications, Anthropological Series, vol. i, Chicago, 1895); Hartman, *Archeological Researches in Costa Rica* (Stockholm, 1901).

INDIANS OF SOUTH AMERICA

Our acquaintance with the ethnology of South America is still very imperfect, for the reason that vast areas are yet unexplored, while in some regions brought under Spanish or Portuguese dominion so much confusion has been wrought by the migration, disintegration, or complete extermination of tribes that the writings of early missionaries or travelers help little to clear up the difficulties. Here, as wherever else the uncivilized man confronts the European, we find the same steady march towards extinction, brought about originally by wholesale massacres and cruelties at the hands of the white conqueror and later by the new diseases which followed in his wake.

As in North America, we find also on the southern continent the phenomenon of vast areas occupied by tribes of some half-dozen linguistic stocks, differing little in habit and all upon nearly the same culture plane, with other areas of mountainous or otherwise difficult country held by a multitude of small stocks with habits almost as widely variant as their languages. In general we may group the tribes by three great regions, viz., the Andean, the Amazonian, and the Pampean—the first being the mountainous territory extending along the Pacific coast from the Isthmus to about 35° south, in central Chile; the second, the whole interior stretching eastward from the summit of the Cordillera to the Atlantic, with the exception of the Chaco; and the third, comprising the Chaco Forest and the grassy plains of the Pampas, between the Andes and the Paraná River, together with southern Chile, and stretching southward to Cape Horn.

In the Andean region we find the highest culture, represented by the Chibcha, Yunca, Aymará, and above all the Quichua, whose empire extended nearly 2000 miles along the coast and made its influence felt even among the wild tribes of the upper Amazon and the Chaco border. In nearly all these nations we find a firmly established system of government, with social distinctions clearly defined; careful and successful agriculture, including irrigation and the use of manures; superior pottery, with curious designs found nowhere else; weaving of cotton and the hair of domesticated animals; beautiful metal work in gold, silver, and bronze; and an architecture with such enduring monuments as the stupendous ruins of Gran Chimu, Paucartambo, and Tiahuanaco. So far as can be learned, the various governments were based upon the clan system, even in Peru, where the Inca himself was but the executive officer of a council of the gentes. Of the various religious systems the best known is that of the Quichua, whose great god was the Sun, after whom came their culture hero, the white and bearded Viracocha. The dead, usually wrapped in various garments and pieces of cloth, were buried in the earth; often the grave was walled in with flat stones. Anything in the nature of a hieroglyphic system appears to have been unknown. The Quichua used the *quipu*, or knotted cords, in keeping their accounts. The descendants of these cultured Andean nations still number many millions, in fact constituting the bulk of the population over large areas; and although in theory accorded equal civil rights, they are yet, like aboriginal races elsewhere, in a state of practical vassalage to the dominant race of the conqueror.



MAP OF SOUTH AMERICAN LINGUISTIC STOCKS.

1 Alikulufan
2 Allentiacan
3 Andaquian
4 Apolistan
5 Araucanian
6 Arawakan
7 Ardan
8 Atacameñan
9 Aymaran
10 Barbacoan
11 Betoyan
12 Bororoan
13 Calchaquian
14 Cañarian
15 Canichanan
16 Carayan
17 Cariban
18 Caririan
19 Cayubaban
20 Changoan
21 Chapacuran
22 Charruan
23 Chavantean
24 Chibchan
25 Chiquitan
26 Chocoan
27 Cholonan
28 Chonoan
29 Coconucan
30 Corabecan
31 Cunan
32 Curucanecan
33 Enimagan
34 Esmeraldan
35 Goyatacan
36 Guahiban
37 Guaraunan
38 Guatoan
39 Guaycuruan
40 Itonaman
41 Itucalean
42 Jivaran
43 Jurian
44 Lecan
45 Lorensan
46 Lulean
47 Mainan
48 Makuan
49 Matacan
50 Miranhan
51 Mocoan
52 Mosetenan
53 Moviman
54 Muran
55 Ocoronan
56 Onan
57 Otomacan
58 Otuquian
59 Paniquitan
60 Panoan
61 Peban
62 Piaroan
63 Puelchean
64 Puinavian
65 Puquinan
66 Quichuan
67 Salivan
68 Samucan
69 Sanavironan
70 Tacanan
71 Tapuyan
72 Ticunan
73 Timotean
74 Trumaian
75 Tsonekan
76 Tupian
77 Uitotan
77a Uran
78 Yahganan
79 Yaruran
80 Ypurinan
81 Yuncan
82 Yurucarean
83 Zaparan

The tribes of the Amazon region, the Orinoco, and the Paraná, were all in various degrees of savagery, although nearly all sedentary and more or less agricultural in habit. Cannibalism prevailed extensively, the word itself being derived from the name of the fierce Carib tribe. The custom still exists on some of the southern head streams of the Amazon. Living mainly under the tropics, many tribes went entirely naked, and tattooing and body painting, although occasionally found, were rare. Labrets were worn by a number of tribes. Scalping was unknown, excepting in a portion of the Chaco territory, but several tribes preserved the heads of their slain enemies. (See Head-Hunting.) The blowgun and poisoned arrow were general throughout the upper Amazon and Orinoco regions, curari poison constituting a chief article of intertribal trade. Government was of the loosest, and confederations were almost unknown. The prevailing religious form was a crude animism, apparently several degrees lower than that of the North American savages. Throughout this vast area the tribes which have not disappeared are still nearly in their primitive condition, excepting where devoted missionaries have gathered them into villages, chiefly in Peru, Bolivia, and Paraguay. The Jesuit missions among the Guaraní are recognized as the most successful ever established in America. At one time they contained over 300,000 Christianized Indians, the basis of the modern civilized states of Paraguay and Uruguay.

The tribes of the northern and central Pampean region, including the Chaco and Pampas sections of Argentina, are warlike equestrian nomads and hunters, living in tents of skin, subsisting almost entirely upon meat, and in other respects also very similar to the plains tribes of North America, but superior in the possession of herds of cattle and sheep as well as horses, and in a certain skill in ironworking. The Araucanians of southern Chile, an extension of one of the most important Pampean stocks, have successfully maintained their independence both against the Inca emperors and the conquering Spaniard. The Patagonians resemble their northern neighbors of Argentina, but represent a somewhat lower grade of culture. Like them, they are brave fighters and of fine physique. The natives of bleak Tierra del Fuego are in perhaps the lowest stage of culture found in South America, occupying the merest temporary shelters, going almost naked even in coldest weather, and having no apparent tribal forms or ceremonials. On the other hand, they are skillful hunters and daring fishermen.

On page 123 are given a tentative list and a map, after A. F. Chamberlain, of the existing South American linguistic stocks, so far as present very deficient knowledge permits a classification, Brinton being the chief authority.

Bibliography. The literature is voluminous, but there are few good general works. The special literature is cited in the separate articles for the different tribes, but for a general view the following may be consulted: H. H. Bancroft, *The Native Races of the Pacific States* (5 vols., New York, 1875); A. H. Keane, *Man: Past and Present* (Cambridge, 1900); D. G. Brinton, *The American Race* (Philadelphia, 1901); Livingston Farrand, *Basis of American History* (New York, 1904); Church, *Aborigines of South America* (London, 1912).

As special references for South American Indians, consult: Martin Dobrizhoffer, *An Account of the Abipones* (London, 1822); Im Thurn, *Among the Indians of Guiana* (ib., 1883); Von der Steinen, *Unter den Naturvölkern Zentral-Brasiliens* (Berlin, 1897); Max Schmidt, *Indianerstudien in Zentral-Brasilien* (ib., 1905); Koch-Grünberg, *Zwei Jahre unter den Indianer* (ib., 1909); A. F. Chamberlain, "Linguistic Stocks of South American Indians," in *American Anthropologist*, vol. xv (Lancaster, Pa., 1913).

INDIAN SARSAPARILLA, Nunnari Root. The roots of *Hemidesmus indicus*, an East Indian shrub of the family Asclepiadaceæ, used as a substitute for sarsaparilla.

INDIAN SUBREGION. A zoögeographical district of the Oriental Region, comprising India from the valley of the Indus eastward to the delta of the Brahmaputra and southward nearly to its terminus, where it mingles with the Ceylonese Subregion, which includes Ceylon and the extremity of the Indian Peninsula. It is rich in animal life, which, as a whole, is Oriental in its affinities. The Mediterranean (Palearctic) Subregion seems to extend eastward to the arid valley of the Indus, and India thus possesses several Ethiopian forms, which have led some zoölogists to regard its fauna as Ethiopian rather than Oriental; but the weight of opinion has turned against this view. The eastern shore of the Bay of Bengal is the home of so mixed an animal population that it has sometimes been called an Indo-Malayan subregion, but this is not generally recognized. Northeastern India, along the midslopes of the southern Himalaya ranges, is very different, faunistically, from the peninsular plains or the low hot coastal regions, owing to its elevation, and forms a long westward-reaching tongue of the Indo-Chinese and Manchurian subregions (q.v.). Consult J. G. Bartholomew, *Atlas of Zoögeography* (New York, 1911). See maps under Distribution of Animals; and the paragraph on *Fauna*, under India.

INDIAN SUMMER. A short season of pleasant weather in the Central and Atlantic Coast States, usually occurring in October or November, more rarely in December, and characterized by an almost cloudless sky, calm or light airs, a hazy atmosphere, and mild temperature in the daytime, but rather cool at night. It may last one or two weeks and may recur two or three times during a season, but rarely more than twice. During Indian summer weather the barometer stands above the average, and the cloudless sky indicates that there is in general a descending tendency of the air at some distance above the earth. Balloons ascending to great heights show that there is very little horizontal movement in the air, but what there is is towards the east. At this season the leaves of most plants dry up and drop away, adding their débris to the dust in the atmosphere. Owing to the prevailing dryness, forest fires and prairie fires occur at this time, and the smoke adds to the intensity of the Indian summer haze, but is not necessarily the sole cause of it. Frequently such smoke spreads slowly eastward, gathers moisture to itself, and is followed by clouds and gentle rain. Precisely similar weather occurs in Germany, where it is known as the "Old Woman's Summer" and "St. Luke's Summer," and in England, where it is known as "St. Martin's Summer," or "All Hallow Summer"; these terms being applied to it according to the various dates on which it happens to occur in October or November. There are also many indications of its existence in China and Siam. The haze attending the African Harmattan in December and January appears very similar to that of Indian summer, but the diatom dust that characterizes the former has not yet been found in the latter.

As to the origin of this expression, Mr. Albert Matthews has shown that it does not occur anywhere either in printed books or manuscripts until the year 1794; but at that time it was in use throughout the Atlantic States. The popular belief that Indian summer weather was predicted by the native Indians in conversation with the first European settlers finds no documentary corroboration, and the idea that the term "Indian summer" was employed by the early settlers seems to be a myth. In general, neither this term nor anything corresponding to it is to be found in any Indian language. The term "Indian summer" in its present usage was introduced into England from America. In 1778 Horace Walpole used the same expression, but he evidently had in mind the intense heats of the midsummer weather in India and the West Indies. For full information on the whole subject, consult the *Monthly Weather Review*, vol. xxx, pp. 19–29 and 69–79 (Washington, 1902). No material further contribution has been made to this interesting subject since that date.

INDIAN TAILOR BIRD. See Plate of PENSILE NESTS with article NIDIFICATION.

INDIAN TERRITORY. A former Territory of the United States, now included in the State of Oklahoma (q.v.). It was originally a part of the Louisiana Purchase, settled by the Creek Indians in 1827, and set aside by Congress for the use of the Indians living east of the Mississippi River in 1829. In 1890 the area was decreased about one-half by the creation of Oklahoma Territory from its western part. The Indian Territory as then formed had an area of 31,246.41 square miles. Because the Territory had been reserved for Indian tribes it long remained practically unexplored. According to late treaty provisions it belonged for a long time to the Five Civilized Tribes—the Cherokees, Creeks, Seminoles, Choctaws, and Chickasaws. The Five Civilized Tribes came to it under an agreement with the United States government which guaranteed their tribal authority. These tribes organized for themselves forms of government not unlike those of the States of the Union, having a Principal Chief, or Governor, and a Legislature consisting of a House of Kings and a House of Warriors, elected by popular vote, a national court, school system, and treasury. In the earlier period of its existence this system worked well, but with the influx of white population conditions altered. These whites found themselves without voice in the government and were unable to secure such privileges as were necessary for proper protection and the development of property. Accordingly enactments were passed by Congress having for their purpose the extension of Federal jurisdiction over the Territory, the extinction of Indian governments, the opening of the country to unrestricted white settlement, and the ultimate creation of a State. In 1893 Congress appointed a commission to the Five Civilized Tribes, known as the Dawes Commission. This was given authority to enter into negotiations with the Indians in the Territory for the allotment of their lands in severalty, or to procure a cession of their lands to the United States. This commission had by 1901 finally secured from each of the Five Tribes tentative agreements looking towards allotment and citizenship. In the following years the work of the commission was pushed forward with noteworthy rapidity, and by June 30, 1905, when the commission was discontinued, allotments had been practically completed. In 1897 an Act had been passed giving United States courts jurisdiction within the Territory, and in the following year the Curtis Act was passed, June 28, 1898 (30 Stat. 495), which had for its general purpose the transfers of the control of property rights from tribal authority to that of the United States. It provided, among other things, for the enrollment of citizens preparatory to the allotment of lands, for the regulation of town sites, and the incorporation of towns; and it gave the President a veto power over acts of the tribal governments. Before the preparations for the formal abandonment of communal ownership in favor of individual possession were completed, Congress provided, by an Act of April 26, 1906, for the indefinite continuance of the tribal form of government with certain modifications. By this act tribal taxes were abolished and schools outside of incorporated towns were placed under the control of the Interior Department.

The enrollment of the Five Tribes was definitely completed on June 30, 1907, and at that time the citizenship of the nations was as follows: Seminoles, 3119; Creeks, 18,712; Cherokees, 41,693; Choctaws, 26,730; and Chickasaws, 10,955. The total tribal membership was thus 101,209, of whom 26,634 were full-bloods. The citizenship rolls were closed by operation of Sec. 2 of the Act of April 26, 1906 (34 Stat. 137), on March 4, 1907. In 1914 the allotments were practically completed, although there remained considerable work in connection with the closing of final records and other details and the disposition of the remaining tribal property. In June, 1914, the Cherokee allotments were completed, and members of this tribe became citizens of Oklahoma. The property in possession of the Indians and administered for them by the United States government includes 431,080 acres of coal and asphalt and agricultural lands; 101,080 acres of this are leased, and the proceeds, during the fiscal year 1914 amounting to $250,504, are divided among the Indians for the support of Choctaw and Chickasaw Indian schools. Up to June 30, 1914, there were filed at the Union Agency, which has general charge of affairs of the Five Civilized Tribes, 31,866 leases, of which 29,820 were for oil and gas; 7701 oil and gas leases were approved; 56,201,000 barrels of oil were sold during 1914. There were collected during the year for individual Indians from oil and gas leases $1,449,252 on 12,571,321 barrels of oil, and for the Choctaw and Chickasaw tribes, as royalty from coal and asphalt leases, $250,504. The proceeds of lands sold in 1914 for Indians under the supervision of the agency aggregated $636,042.80. The total property of the Five Civilized Tribes was valued in 1913 at $175,292,444. In 1914 the tribal government consisted of a Principal Chief, or Governor, with such clerical force as is necessary. Practically no governmental functions are exercised, the principal duties of the officials being to look after the interests of the tribe generally and execute conveyances, etc., until such time as tribal affairs are finally closed and the tribal government can be dispensed with entirely. Congress makes annual appropriations to assist the public schools of the State of Oklahoma within the territory occupied by the Five Civilized Tribes for the reason that so much of the allotted land is not subject to taxation that sufficient revenue was not received from taxation to maintain schools properly. About $300,000 is appropriated annually for the maintenance of about 3000 school districts, in which are enrolled about 25,000 Indian and freedmen pupils. The administration of the affairs of the Five Civilized Tribes is in the hands of the Interior Department, through the Commissioner of Indian Affairs.

The agitation for statehood for the Territory began in 1892. This led to the adoption of a constitution by a convention held in the summer of 1905. In November of that year, by an almost unanimous vote, the citizens of the Territory favored separate statehood. In line with these actions a bill was introduced in Congress providing for the admission of Indian Territory as a separate State. Congress, however, favored the joint statehood of Oklahoma and Indian Territory and in June, 1906, passed the Statehood Bill, and, Nov. 16, 1907, the Indian Territory became a part of the State of Oklahoma. See Oklahoma.

INDIAN TOBACCO. See Lobelia.

INDIAN TREATIES. See Treaties, Indian.

INDIAN TURNIP. See Arum; Jack-in-the-Pulpit.

INDIAN YELLOW, or Purree. A coloring matter highly esteemed by artists. It is exported from the East Indies and China in spherical masses, which are of a dark-brown color externally, but of a bright orange yellow in the interior. It is obtained in Bengal as a sediment from the urine of cows fed on decayed and yellow mango leaves. Its odor is peculiar and resembles that of castoreum. It consists chiefly of the magnesium salt of an acid termed *purreic*, or *euxanthic, acid* ($C_{19}H_{16}O_{11}$). Alkaline solutions dissolve this acid and form a yellow liquid. A solution of euxanthate of potash, when mixed with the solutions of the salts of the earths, gives brilliant yellow, sparingly soluble precipitates, and with acetate of lead it forms an insoluble yellow. Purree is fugitive as a water color and injures many lakes, but is unaffected by sulphur compounds. It is often found adulterated with chrome yellow.

INDIA RUBBER. See Rubber.

IN′DICAN. A substance found in the blood and urine of man and the Herbivora. According to Abderhalden, the indoxyl of urine is wrongly called indican. It is chemically indoxyl potassium sulphate and is an oxidation product of indole in the fæces. It is believed to be formed by the oxidation of indole in the intestines, forming indoxyl, which latter substance combines in the liver with sulphuric acid and is eliminated as indoxyl-potassium sulphate, or indican. The occurrence of indican in the urine is thought by many to indicate putrefaction in the intestinal canal and to be significant of "intestinal autointoxication," but this theory has lately been shown to have little or no basis in fact. See Indigo.

IN′DICA′TOR (Lat., pointer). In steam engineering, an instrument to measure and to record by means of a diagram the pressure of the steam in the cylinder of a piston engine. The indicator was invented by James Watt, of steam-engineering fame, and the modern indicator is merely a structural modification of Watt's original design. Concisely described, the modern steam-engine indicator consists first of a small cylinder having communication with the interior of the engine cylinder by means of a short pipe provided with a stopcock. In this small cylinder works a piston having a piston rod extending out of the top of the cylinder. This piston is normally pressed down to the bottom of the cylinder by a calibrated spiral spring; but when steam is admitted below the piston by opening the stopcock previously mentioned, the pressure forces the piston upward against the spring, compressing it a greater or less amount, according to the steam pressure and the resiliency of the spring, which is known and measured. The top of the piston rod is attached to a lever which carries a pencil at one end. This pencil bears against a slip of paper attached to a drum, which rotates back and forth on its axis for a distance and with motion which corresponds exactly to the stroke and movement of the engine piston. In operation the indicator piston rises and falls with the rise and fall of the steam pressure in the cylinder, and the pencil point is thus given a vertical movement whose magnitude corresponds to the intensity of the steam pressure and is measurable on the diagram when the compression of the spring and the motion of the pencil per pound of pressure are known. At the same time the rotation of the drum gives the paper a horizontal movement under the pencil point, corresponding in magnitude and speed to the engine-piston movement, so that the result of the two operations is the inscription of a closed diagram on the paper. These diagrams, being drawn to scale, enable the steam engineer familiar with their use to calculate the power of the engine, to examine and adjust the actions of the engine valves, and to make certain inferences concerning the transformation of heat into work, and the influence of the metal of the cylinder on that operation. Special forms of indicator have come into use with the high speeds and high temperatures which are met in the internal-combustion engine (q.v.). One of these is a maximum-pressure indicator, giving no diagram, but indicating by motion of a lever when and at what pressure the maximum pressure takes place. The other is called the manograph, and in it a flexible calibrated diaphragm receives the pressure, and a mirror reflects the double motion of pressure and

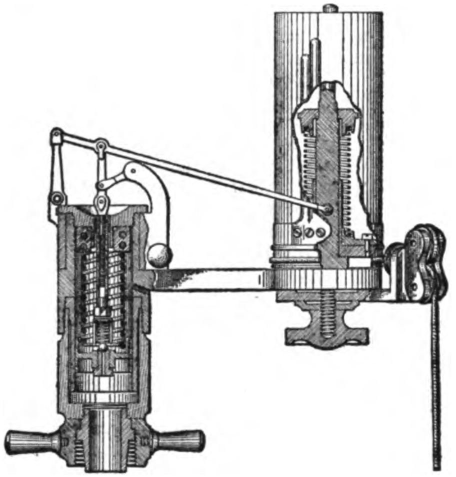


Fig. 1. steam-engine indicator.

piston. (See Manograph.) A concise treatise on the subject of indicators and indicator diagrams is Peabody, *The Steam Engine Indicator* (New York, 1900).

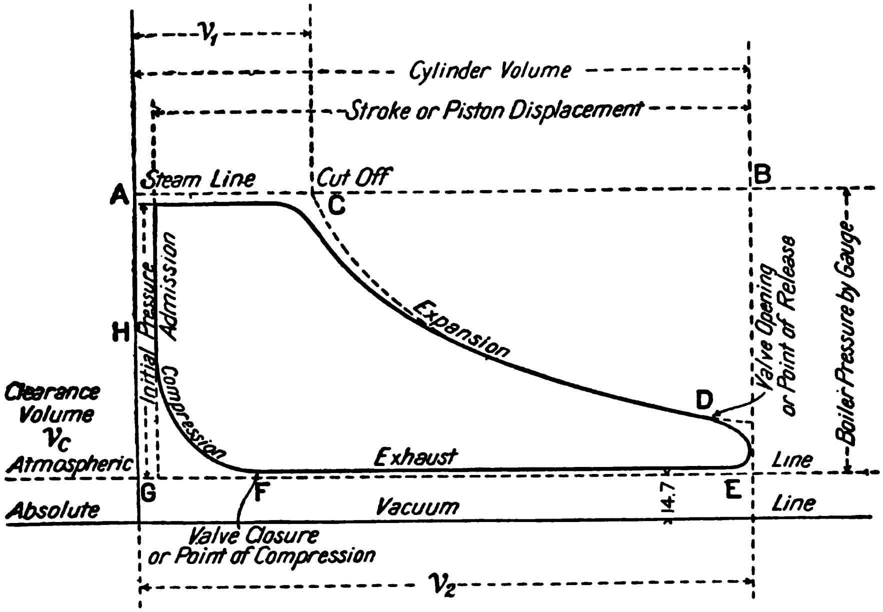


Fig. 2. Indicator diagram.

INDICTION, ĭn-dĭk′shŭn (Lat. *indictio*, imposition of a tax, period of 15 years, from *indicere*, to declare, from *in*, in + *dicere*, to say, Skt. *diś*, to show). A period or cycle of 15 years, the origin of which is involved in obscurity. It began to be used in reckoning time, chiefly by ecclesiastical historians, during the life of Athanasius; it was afterward adopted by the Popes, through whose influence it came to be so generally employed during the Middle Ages that the dates of charters and public deeds of this period are expressed in indictions as well as in years of the Christian era. See Chronology.

INDICTIO PASCHALIS, ĭn-dĭk′shĭ-ō păs-kā′lĭs (Lat., Easter declaration). A custom that arose in the early Christian Church of Alexandria of announcing on Epiphany the days on which Easter would fall. Later this declaration was called the *Indictio festorum mobilium*, the announcement of the movable feasts, because the time when these should be celebrated depended upon the appointment of the days for Easter. The custom soon became general; the fourth Synod at Orléans (541) issued a formal order for the observance in its first canon.

INDICTMENT, ĭn-dīt′mĕnt (from OF. *enditer*, *endicter*, *inditer*, *indicter*, to accuse, Lat. *indictare*, frequentative of *indicere*, to proclaim, from *in*, in + *dicere*, to say, Skt. *diś*, to show). The formal written accusation of crime against a person, presented on oath by a grand jury (q.v.), and upon which he is tried by a petit jury. In Scotland an indictment is also the accusation on which a prisoner is tried; but it runs in the name of the lord advocate, addressed to the prisoner. In England a prisoner is not entitled, before trial, to a copy of the indictment or a list of the witnesses against him except in case of treason. An indictment differs from an information (q.v.) in that it is the act of a grand jury, while an information is the written accusation of crime by the law officer of the crown or of the state. It differs from presentment (q.v.) in that the latter is an accusation by the grand jury of its own motion, and without any charge of crime or any bill of indictment being laid before it.

In the United States persons who are accused of felonies or grave misdemeanors can be brought to trial only upon an indictment which a grand jury has declared to be "a true bill," the right to be prosecuted only on indictment by a grand jury "for a capital or otherwise infamous crime" being preserved by the Constitution of the United States (Amendments, Art. V) as well as by those of the several States. When a criminal court is convened, and the grand jury has been duly constituted and instructed, the State's attorney, or some other duly qualified officer, lays before them drafts of indictment against the alleged offenders and furnishes them with the names of the witnesses whose testimony is relied upon to support the accusation. These witnesses the grand jury examines ex parte, not to determine the guilt or innocence of the accused, but to ascertain whether there is or is not prima facie evidence of guilt sufficient to warrant their trial. If 12 or more members of the grand jury pronounce in the affirmative, the presentment, with the words "a true bill" indorsed upon the back thereof, is sent to the court; and, upon the charges therein contained, carefully set forth in the indictment subsequently prepared, the accused is put upon trial before a petit jury. The indictment is prefaced by a "caption," in which are set forth the name, term, and place of meeting of the court, the names of the justices, and the fact that the grand jury was lawfully constituted. Then comes a full and particular description of the alleged crime; the name of the accused must be given if known; and if not, he must be described in such a way as to make his identity sure. The time and place of the commission of the crime must also be stated, though it is not always necessary to conviction that these particulars should be exactly supported as charged. In some cases, however, a failure upon this point is fatal to the indictment. In trials for perjury the exact day when the offense was committed must be named. To prove that the crime was committed on some other day will not avail. In cases of murder the death must be described as occurring within a year and a day of the time when the alleged fatal injury was inflicted. When several persons have been concerned in the commission of a crime, they may be indicted either jointly or separately. It is usual to describe the alleged offense in different ways, in what are usually called "counts," in order to cover any uncertainty that may exist beforehand as to the precise way in which it was committed. It is enough if the prisoner is convicted upon a single count. The indictment must charge explicitly whatever is necessary to constitute the offense. But though the offense of a prisoner may have involved the commission of two or more distinct crimes, as, e.g., arson, burglary, and murder, the indictment can charge only one of the crimes. The others must be charged in separate indictments. Formerly in England and to-day in some of the United States the drawing of an indictment is an exceedingly delicate and precarious undertaking because of the tendency of the courts, in the interests of the accused, to quash the indictment or even to set aside a conviction because of technical errors, even of the most trifling character, such as a mistake in spelling, the insertion of a superfluous word, the failure to dot an *i* or cross a *t*. This tendency had originally a certain justification when courts and juries were forced into a tacit conspiracy to defeat the harsh and inhuman penal law which prevailed in England in the eighteenth and early part of the nineteenth century, but its survival in American criminal jurisprudence is to-day only an abuse of justice. It is only fair to say, however, that in most American States as well as in England this reproach has been removed by statute or by the adoption of a more enlightened attitude by the courts. In many of the States the harsh rule of the common law which denied the right of a person accused of treason or felony to have a copy of the indictment has been abolished. Consult: Pike, *History of Crime in England* (London, 1876); F. Wharton, *Precedents of Indictments and Pleas* (4th ed., 2 vols., Chicago, 1881); Stephen, *History of the Criminal Law of England* (ib., 1883); Pollock and Maitland, *History of English Law* (2d ed., Cambridge, 1899); H. C. Joyce, *Treatise on the Law Governing Indictments* (Albany, 1908); also the authorities cited under CRIMINAL LAW. See GRAND JURY.

INDIF'FERENTISM (from *indifferent*, from Lat. *indifferens*, not different, from *in-*, not + *differre*, to differ, from *dis-*, apart + *ferre*, to bear). A term used in philosophy and ethics to designate the theory that the human will is absolutely indifferent to all motives. The doctrine is also called indeterminism, or the doctrine of the liberty of indifference, and is opposed to determinism. See FATALISM; DETERMINISM; ETHICS; FREE WILL.

IN'DIGES'TION (from Lat. *indigestio*, indigestion, from *in-*, not + *digestio*, digestion, from *digerere*, to digest, from *dis-*, apart + *gerere*, to carry), or DYSPEPSIA. A term somewhat vaguely applied to various forms of disease of the stomach or of the small intestines in which the natural process of digesting and assimilating the food is deranged. The common cause of indigestion, where organic disease is absent, is the eating of too much food, too rapidly, or without sufficient mastication.

The symptoms of indigestion are by no means constant in all cases. There is often *anorexia* (or want of appetite), but occasionally the appetite is excessive and even ravenous. Nausea not infrequently comes on soon after a meal; while in other cases there is no nausea, but after the lapse of a couple of hours the food is vomited, the vomited matters being very acid, and often bitter from admixture of bile. In severe cases the vomiting has been known to occur after every meal for several months. Flatulence, relieving itself in eructations, is one of the standard symptoms of this affection, the gas that gives rise to this symptom being sometimes evolved from undigested matters in the stomach. It is very apt to occur in dyspeptic patients if they have fasted rather longer than usual. *Cardialgia* (popularly known as *heartburn*), *pyrosis* (q.v.), or water brash, and *gastrodynia* (commonly designated *spasm* or *cramp* of the stomach, and coming on at uncertain intervals in most severe paroxysms) are somewhat less common symptoms of indigestion.

The treatment of indigestion is more dietetic than medicinal. All bad habits suggested above must be corrected. The quantity of food which can be digested by the gastric juice and intestinal fluids being limited (see DIGESTION, ORGANS OF), care should be taken to avoid excess; moreover, the meals should not succeed each other too rapidly. With regard to the nature of food best suited to dyspeptic persons, it may be safely asserted that a mixture of well-cooked animal and vegetable food is in general more easily digested than either kind taken exclusively. Each patient should be advised by his physician as to his dietary. The unquestionable benefit which dyspeptic patients often derive from a visit to a hydropathic establishment is due perhaps not so much to any specific action of the water as to the well-regulated diet, the withdrawal of the mind from personal cares, and the change of scene. The use of purgatives and remedies for indigestion is much overdone by the laity and lays the foundations of chronic gastric disorder that cannot be cured. See DYSPEPSIA and GASTRITIS, the chronic form of which is generally accompanied by indigestion.

INDIGIRKA, ēn'dyė-gēr'kȧ. A river of east Siberia. It rises in the Stanovoi Mountains, 400 miles east of Yakutsk, and, after flowing in a northeasterly direction for about 900 miles across a sparsely populated and frozen desert region, it empties through a large delta into the Arctic Ocean, 460 miles east of the mouth of the Lena (Map: Asia, Q 2). It is navigable during the summer months.

IN'DIGO (Sp. *índigo*, *índico*, from Lat. *indicum*, from Gk. *ἰνδικόν*, *indikon*, indigo, from Ἰνδία, *India*, India). A coloring matter first employed as a dyestuff in India, whence it was brought by traders to the Mediterranean countries. Europeans were not acquainted with its vegetable origin until the time when its importation assumed considerable dimensions, after the circumnavigation of Africa; and as the method of dyeing with woad did not present the indigo in substance, the virtual identity of the two was not suspected. Of late years artificial indigo has been produced from coal-tar products and is seriously threatening the existence of the indigo plantations. For the history of artificial indigo, see COAL-TAR COLORS.

Most of the natural indigo of commerce is obtained from species of *Indigofera*, of the family Leguminosæ. The genus embraces about 400 species, widely distributed throughout tropical and subtropical regions. The best-known and most widely cultivated species, as well as the ones which supply nearly all the indigo found in the markets, are *Indigofera anil*, a native of tropical America, and *Indigofera tinctoria*, the original home of which is not positively known, although it is said to occur wild in the Bombay Presidency. *Indigofera argentea*, a native of Arabia and parts of Africa, is a source of much of this valuable dye. Indigo plants are extensively cultivated in the East and West Indies (especially in Bengal), in Central America, parts of Europe and Africa, etc. The plants are shrubby, attaining a height of about 6 feet, have pinnately compound leaves and usually pink or purple flowers. The pods of *Indigofera anil* are sickle-shaped, short, and compressed, while those of *Indigofera tinctoria* are straight, cylindrical, and many-seeded. When cultivated, the indigo plant requires a rich, friable soil, well watered, but not too wet. The seeds are sown in drills about a foot apart, and the plants are cut when beginning to flower. In the tropics this can be done at frequent intervals, and four or five crops a year obtained. After cutting, the crop is handled in various ways, fermented in tanks, as described below, and the indigo extracted. Although the plants are perennial, the greatest yields are obtained from annual plantings. In addition to the species mentioned above, at least half a dozen other species of *Indigofera* are known to produce indigo of good character. It is also produced by species of *Sophora*, *Baptisia*, *Amorpha*, *Tephrosia*, and *Galega*, all belonging to the order Leguminosæ. *Baptisia tinctoria* and *Amorpha fruticosa* are known as "false indigo" in the United States, where they are widely distributed. Plants of other families produce indigo, as *Isatis tinctoria*, a cruciferous plant which was cultivated in Europe during the Middle Ages and is still planted in southern France (see WOAD); *Wrightia* and *Nerium*, which belong to the family Apocynaceæ; *Marsdenia tinctoria* and *Gymnema tingens*, of the natural order Asclepiadaceæ; *Polygonum tinctorium*, of the order Polygonaceæ; *Strobilanthes flaccidifolius*, of the order Acanthaceæ; *Spilanthes tinctoria* (Compositæ), and *Scabiosa succisa* (Dipsacaceæ), as well as many others, representing widely separated orders of plants.

INDIGO.

Neither the indigo plant nor *Isatis tinctoria* contains the dyestuff (indigotin) ready formed, but rather a colorless glucoside, indican (q.v.), which breaks up, by fermentative processes, into indigotin, and a glucose sugar called indiglucin. It is a curious fact that indican is a normal constituent of human urine and becomes very plentiful in certain diseases. Natural indigo is prepared for the market in the following fashion: The plants are cut down just before reaching the flowering stage and are thrown into vats, where they are steeped in water and allowed to ferment for 12 to 15 hours, practically out of contact with air. This produces the soluble *indigo white*, which is taken up by the water; the liquid is then drawn off into "beating vats," where it is violently agitated by machinery, in order to promote contact with the air, so that the indigo white is oxidized to the insoluble *indigo blue*, which forms a thick scum on the surface and then sinks to the bottom as a bluish mud. After settling, the clear liquid is drawn off, and the indigo blue is collected, squeezed between cloths, and dried in the air. It is sold in irregular lumps, which differ in tint, size, and texture according to the various localities in which they are produced. The amount of available dyestuff ranges from 20 to 90 per cent of the commercial product, some of the impurities being accidental, although intentional adulteration is common enough. This irregularity of composition in the natural product is one of the causes that have advanced the manufacture of artificial indigo, which is always chemically pure.

There are a large number of patented processes for the preparation of synthetic indigotin, chiefly held by the German color factories and largely based upon the researches of Adolf Baeyer, who showed, about 1880, what the exact chemical constitution of this substance is and indicated the general principles for its preparation from aniline derivatives. At present artificial indigo is manufactured by a process worked out by the Badische Anilin-und Sodafabrik at Ludwigshafen upon a basis furnished by Heumann. Naphthalene, an abundant ingredient of coal tar, is first oxidized by fuming sulphuric acid to phthalic acid, from this phthalimide is formed, and this converted into anthranilic acid. This latter reacts with monochloracetic acid to form a compound (phenylglycocoll-carboxylic acid) which fused into caustic soda is converted into indoxyl, which by atmospheric oxidation yields pure indigo blue. The working out of the artificial indigo manufacture brought in its wake the development of the new contact process for sulphuric acid and the production of electrolytic chlorine. In 1906 it was estimated that 80 per cent of the world's consumption of indigo was supplied by the artificial product, while the cultivation of the indigo plant has shrunken correspondingly. Natural indigo is still used, either with or without woad, in certain cases of cloth dyed for government consumption. Pure indigotin, whether extracted from natural indigo or prepared artificially, is crystalline, with a coppery lustre and a very characteristic odor; when crushed, it forms a blue powder, and when fixed upon the fibre it constitutes a remarkably fast and brilliant "navy-blue" dye. Numerous compounds of indigo are now prepared as dyes, such as indigo red, indigo scarlet, and indigo yellow. In the first two indigo is combined with sulphur as Thio-Indigo Red B and Thio-Indigo Scarlet R; in the last the combination is with benzoyle chloride.

Dyeing with Indigo. As indigo blue is insoluble in water, it must first be converted into indigo white, which is soluble in alkaline liquids. This change is produced by the chemical addition of hydrogen, so that the blue, $C_{16}H_{10}N_2O_2$, goes over into the white, $C_{16}H_{12}N_2O_2$. This is effected in *cold* vats, which are employed for the dyeing of cotton and linen, by metallic reducing agents, such as sulphate of iron, zinc dust, and alkaline sulphites; while wool and silk are dyed in *warm* vats, where the reduction is caused by a fermentation of vegetable substances, preferably woad, in a manner analogous to that by which indican is converted into indigo white. These vats are always alkaline. When the reduction of the indigo is completed, the liquid is colorless, with a light bluish scum on top. The scoured materials are then drawn through the vats and exposed to the air while drying. The atmospheric oxygen immediately reconverts the white into the blue, by removing the extra hydrogen atoms. Indigo blue is also soluble in fuming sulphuric acid, forming "indigo-sulphonic acid," or Saxon blue, which was formerly known as a dyestuff, but has been replaced in modern practice by its sodium salt, *indigo carmine.* The solution of this carmine produces a blue precipitate upon the fibre with an alum mordant, but the color is neither as deep nor as fast as that of the unaltered indigotin from the reducing vats. With artificial indigo the final synthesis can be produced on the fibre itself, as when orthonitrophenylpropiolic acid and potassium xanthogenate are applied separately and the doubly impregnated cloth is then steamed.

Printing with Indigo. Indigotin is not suited to printing in pigment form, and figured goods are produced by dyeing processes. To procure a blue-and-white pattern, the whole fabric may first be dyed blue, and the white produced by printing on bleaching agents which will remove the color. Or the cloth may first be printed with a "reserve," or resist, a paste composed of gum, pipe clay, and copper salts, to prevent the deposit of indigo upon the spots which they protect, while the material passes through the vat. Artificial indigo can again be produced by printing one chemical upon the fibre and putting the other into the bath through which it is subsequently passed.

Bibliography. Baeyer's articles in the *Berichte der deutschen chemischen Gesellschaft* (Berlin, 1879–90); Benedikt, *Chemistry of the Coal-Tar Colors* (London, 1889); Nietzki, *Chemistry of Organic Dyestuffs* (ib., 1892); Sadtler, *Handbook of Industrial Organic Chemistry* (Philadelphia, 1895); Brunk, *History of the Development of the Manufacture of Indigo* (Berlin, 1901); Lachmann in the *Journal of the American Chemical Society* (Easton, Pa.) for 1901; F. H. Thorp, *Outlines of Industrial Chemistry* (2d ed., New York, 1911).

INDIGO BIRD. See INDIGO BUNTING.

INDIGO BUNTING. A North American finch (*Passerina cyanea*) of the eastern United States. It breeds as far north as Nova Scotia and Minnesota, but migrates southward in the fall to Central America, where it spends the winter. It is about 5½ inches in length, and the adult male is rich dark blue in color, variously tinged and shaded, the lores and angles of the chin velvety black. The female is gray brown. It frequents open places on the edges of woods and delights to sit on the top of a high tree singing a very sweet and peculiar melody, continued late into summer, after most other birds have stopped singing. It is easily domesticated. The nest is built of grasses, leaves, bark, and long hairs, in a little bush or on weeds near the ground. The eggs are three or four, pale bluish white, without spots. See Colored Plate of EGGS OF SONG BIRDS.

INDIGO SNAKE. See GOPHER SNAKE.

INDIRECT HEATING. See HEATING AND VENTILATION.

IN'DIUM (Neo-Lat., from Lat. *indicum*, indigo). A metallic element, discovered spectroscopically by Reich and Richter in 1863. It occurs in minute quantities in various zinc ores, especially in the zinc blendes of Freiberg, in some galenas from Italy, in the flue dust of zinc furnaces, and in various manganese ores. In the metallic state the element may be obtained by reducing its oxide in a current of hydrogen, or by fusing the oxide with sodium, or else by the electrolysis of its chloride, nitrate, or sulphate. The oxide itself is obtained by dissolving Freiberg zinc in weak sulphuric acid, precipitating the solution with metallic zinc, and separating out, from the precipitate, lead, copper, and iron. With oxygen indium forms an oxide of the formula In_2O_3. Its hydroxide, $In(OH)_3$, is similar to that of aluminium. A number of its salts have been prepared, but none of them has any economic value. In its salts indium may act as a univalent, bivalent, or trivalent element. Thus, it forms three different chlorides: $InCl$, $InCl_2$, and $InCl_3$. As a rule, only the salts of trivalent indium can be dissolved in water without being decomposed. Metallic indium is ductile, silver white, and lustrous. Its specific gravity is about 7.1, and it melts at 155° C. (311° F.). Its chemical symbol is In, and its atomic weight is 114.8.

IN'DIVID'UALISM (from *individual*, from ML. *individualis*, relating to an individual, from Lat. *individuus*, indivisible, from *in-*, not + *dividuus*, divisible, from *dividere*, to divide). The doctrine that society is only an artificial device, whose value is to be gauged by its conduciveness to the good of the several associated members or by some other standard set by these individuals. Individualism must be distinguished from egoism, with which it is often confounded. While individualism perhaps is generally egoistic in character, it is not always so. An individualist may maintain that the end which justifies all justifiable means is "the greatest good of the greatest number"; what makes him an individualist is his conception of the greatest number as composed of *independent* units, the happiness of each of which is to be reckoned as *a separate item* in the sum total of general happiness. Such being the nature of individualism, it is clear that in all the sciences which deal with man as a social being there may be individualistic tendencies. And as a matter of fact individualism has been a marked characteristic of many prominent theories in political science, in economics, and in ethics.

In political theory the consistent individualist regards the state as a means to subserve individual ends. He may be an egoistic anarchist, desiring to remove all restraints which the state imposes upon his freedom of action. On the other hand, he may be an absolutist, believing that the restraints imposed by a supreme government are necessary to prevent the disastrous consequences which would follow from every man's acting upon his unregulated desires and thus involving himself in perpetual warfare with all his neighbors. Thus, we see that the sovereignty of government, which the individualist must deny in ultimate theory, he may stoutly maintain in practical politics. Hobbes, the prime individualist of modern times, was nevertheless one of the stanchest supporters of unlimited despotism when despotism was making its last stand against parliamentary government in England. Again, an altruistic individualist may, like the egoistic, be either an anarchist or a believer in government. The anarchism of our day is in large measure a reaction against absolutism, a reaction motived by a sincere desire to secure for mankind at large the blessings of freedom. The trouble with it is that it conceives freedom as license and regards license as in its nature humane when not irritated by authority. Other altruistic individualists, however, who do not share with the benevolent anarchist the optimist belief that man is by nature a saint and only by government a sinner, justify government as a necessary evil—an evil because individuality is more or less repressed by law, but a necessity because without some measure of such repression some individuals would make life intolerable or even impossible for others. It is thus clear that individualism as a political theory is quite compatible with acquiescence in and support of almost any form of government or even with revolt from all government. Practical individualism, on the other hand, may prevail to a large extent along with anti-individualistic theories, for it is quite logically consistent for a thinker to maintain that the true end of all government is the welfare of society as an organic whole, and yet that this welfare can best be served by allowing every individual to pursue his own ends.

In economics individualism has generally advocated the practice which is formulated in the well-known precept, *Laissez faire, laissez passer.* The state is to keep hands off of the economic machinery. Free competition, resulting in the survival of the economically fittest, is the individualistic ideal. Hence we find among individualists a tendency to oppose all sumptuary and other economic legislation. Compensation for service rendered is held to be a matter which concerns merely the parties immediately involved, and no general laws, it is urged, should control the unrestricted privilege of any man to buy labor as cheap and to sell it as dear as the relation between supply and demand allows. No minimum of wage, no maximum of hours, no restriction upon the age or sex of employees, no employer's liability except as specified by contract, no fostering of industries by tariff or subsidy, no political arbitration of economic disputes, no government ownership or operation of any industrial plant—in short, no state interference in production, distribution, or consumption—this is what absolute and unadulterated individualism is apt to hold before itself as the true type of the industrial life. But pure economic individualism is at the present day more a theory than a practice. Public policy has asserted itself against private license, and the struggle at present is not so much between state interference and free competition as between different views as to the points at which state interference is advisable. Individualism has become more of a war cry than an accurate designation of economic principle. The question is only as to the character of the limitations to be put upon the freedom of the individual in his economic relations.

In ethical theory individualism is not now so important a factor as it was a century or so ago. Pure individualism is often thought incompatible with morality as ordinarily understood. If each man's ideals are the measure of his morality, morality, it is claimed, ceases to have any general meaning. This is frankly recognized by some individualists; but some, on the other hand, still maintain the possibility of carrying their theory out logically without detriment to morality. The typical representatives of the latter view are to be found among those who claim for the individual conscience the right to pass definitively upon all questions of morals. "There is no such thing as an erring conscience," they say. In some thinkers, as, e.g., Kant, the individualism of the conscience theory of morals is offset by the universalism of the criterion of reason, which directs the conscience. One must see one's duty only in what can be duty for all. The combination of individualism and anti-individualism in an ethics of conscience is, however, a *tour de force* which can be successfully achieved only by those who unknowingly have a higher standard for morality than either conscience or pure reason. But when this higher standard is lacking, individualism gets the upper hand, and we have as the logical result the view that everything is right which a man thinks to be right. The individual with all his idiosyncrasies becomes the measure of the universe. Most ethical thinkers have come to see that this is the natural consequence of the contention that conscience is the supreme *arbiter morum*, while moral practice has always been controlled by other influences besides the conscience of the individual. Or perhaps it would be more correct to say that these other influences operate upon a man by giving character and direction to his conscience, so that while he is guided by his conscience, that conscience is not merely an individual peculiarity. It reflects with greater or less accuracy the ideals of his community—a community sometimes large, sometimes small, but, whether large or small, of decisive influence in determining the kind of conscience the man is to have. Hence, as conscience is not something ultimate and intuitive, but derivative, there is no reason for supposing that its dictates are infallible. The individual reflects the opinions, prejudices, superstitions, and sane judgments of a community and gives to them perhaps an individual coloring, especially in matters bearing on his own conduct. The result we call conscience.

Consult: M. S. Schmidt, *Der Einzige und sein Eigenthum* (Leipzig, 1845); Spencer, *Man versus the State* (London, 1884); Donisthorpe, *Individualism: A System of Politics* (ib., 1889);

Ritchie, *Principles of State Interference* (ib., 1891); Le Gall, *La doctrine individualiste et l'anarchie* (Toulouse, 1894); McKechnie, *The State and the Individual* (Glasgow, 1896); Tufts and Thompson, *The Individual and his Relation to Society, as Reflected in British Ethics* (Chicago, 1898); Lutoslawski, *Ueber die Grundvoraussetzungen und Consequenzen der individualistischen Weltanschauung* (Helsingfors, 1898); Wenzel, *Gemeinschaft und Persönlichkeit* (Berlin, 1899); Fournière, *Essai sur l'individualisme* (Paris, 1901); Biermann, *Die Anschauung des ökonomischen Individualismus* (Berlin, 1905); Huth, *Soziale und individualistische Auffassung im 18. Jahrhundert* (Leipzig, 1907); C. W. Eliot, *Conflict between Individualism and Collectivism in a Democracy* (New York, 1910); W. Fite, *Individualism* (ib., 1911). See Sophists; Grotius; Hobbes; Locke; Spinoza; Quesnay; Mirabeau; Turgot; Smith, Adam; Bentham; Bright, John; Marx; Spencer, Herbert; Nietzsche.

IN'DIVID'UAL'ITY (ML. *individualitas*, from *individualis*, relating to an individual). Separate or distinct existence. There is some difference of opinion as to what constitutes individuality, the discussion being principally confined to the domain of natural history. Driesch, a modern vitalist, defines an individual living organism as a typical constellation of different elements, preserved in spite of metabolism, existing in numerous exemplars, exhibiting the phenomenon of development, and possessing as its most important properties the faculties of regulation, reproduction, and active movement. Such an individual, he maintains, is more than the sum of its inorganic parts; for its behavior, especially in morphogenesis, cannot be explained in terms of substance and causality, or matter and energy, but only through a new category, individuality, and in terms of entelechy—an autonomous factor which is not energy, and which does not deflect, but merely suspends or relaxes energy. Mechanists tend to define individuality less absolutely. They emphasize independence in the sense of ability to maintain a typical structural form in spite of minor changes and accidents, a typical chemical composition (protoplasm), and the ability to grow and to reproduce. Any substance which exhibits these characters they regard tentatively as an individual. In the concrete case the demarcation of individuality is often difficult. Certain crystalline forms, e.g., exhibit many of the characters of the living individual organism. Consult Driesch, *Science and Philosophy of the Organism* (London, 1908), and Huxley, *The Individual in the Animal Kingdom* (Cambridge, 1912).

Individuality, in the psychological sense, implies a unity of experience, which is socially effective and socially recognized, and which is constituted in the main by consistency of purpose and continuity of personal memory. (See Mental Constitution; Self.) The problems which individuality presents to normal psychology are discussed under Individual Psychology. The term is also employed in psychopathology. Cases have not infrequently been reported where, as the result of hypnosis or of some form of disease, the memory-continuum has been broken off, and another (with different determinations) instituted in its place. A person thus affected loses all memory of previous existence, together with name, home, family, and friends, and begins a life so new and so different that he may be called another and different individual. Alternations of the two personalities may appear; and not only two, but as many as nine or ten personalities may exist, in the same body, in complete or partial independence of one another. See Double Consciousness.

Consult: Bourru and Burot, *Variations de la personnalité* (Paris, 1888); Binet, *Alterations of Personality* (New York, 1896); William James, *Principles of Psychology* (2 vols., ib., 1899); Podmore, *Studies in Psychical Research* (London, 1899); P. M. F. Janet, *L'Automatisme psychologique* (Paris, 1899); id., *Mental State of Hystericals* (New York, 1901); id., *Major Symptoms of Hysteria* (ib., 1907); Morton Prince, *Dissociation of a Personality* (ib., 1906); id., *The Unconscious* (ib., 1914).

INDIVIDUAL PSYCHOLOGY, or Differential Psychology. That branch of psychology which deals with the minds of individuals and with the likenesses and differences between the minds of individuals. Differential psychology has sometimes been taken to include the study not only of these differences, but also of the differences between collective minds. (See Social Psychology.) Individual psychology differs from general psychology (see Psychology) as concrete from abstract, phenomenological from universal. For general psychology individual minds are important, because only through them is it possible to arrive at a knowledge of mind at large; they are important, i.e., not as such, but as manifestations of a general or typical mind whose uniformities are to be discovered. For the individual psychologist, on the contrary, individual minds are directly important. They are themselves the objects of investigation, units whose nature and whose differences it is his immediate task to describe.

The principal problem of individual psychology, as above defined, is (1) to determine the nature and the range of mental variations. This main problem may be subdivided into three subordinate problems. The individual psychologist must (*a*) investigate single processes in a large number of minds, thus determining the range and distribution of the various mental factors (theory of variations). He must (*b*) investigate a large number of factors in the single mind, determining the relations of the single factors to one another and their significance for the mind as a whole (psychography). And he must (*c*) investigate two or more factors in a number of minds, determining the general tendencies of the single factor to vary directly or inversely with the others or independently of them (theory of correlation). A limiting case of this problem appears when the number of factors is large, and the number of minds is reduced to two, the aim then being to determine the factor or group of factors to which the general or total difference of the two minds may be attributed (theory of comparisons). The results of these inquiries form the contents of individual psychology proper. We have, however, further to inquire (2) into the conditions of the variations which we have established; we must investigate the influence of heredity, climate, position in life, education, sex, age, etc. And lastly (3) we must examine, classify, and explain the expressions of mental difference in handwriting, physiognomy, characteristic gesture, literary style, etc.

The first of the three main problems is at present the most important. The theory of variations has led to the elaboration of a doctrine of psychological types, such as the temperaments and the memory types, the grades of intelligence, types of abnormality, etc. Psychography has thus far furnished us with the psychological portraits of a few eminent persons and with a programme of future work. The theory of correlation shows a vigorous activity. It is the most systematic of the three minor branches of individual psychology, and by its methodical range promises to contribute more both to science and to practice than the other two.

The special methods of individual psychology are three. The first is that of abnormal cases: we may take advantage of instances in which there is extreme enfeeblement (perhaps even loss) of some function to study the resulting modification of other functions. We may ask, e.g., how loss of memory affects imagination, attention, etc. The second is that of mental tests. (See MENTAL TESTS.) In theory we may find problems whose solution depends essentially upon the presence or the concernment of some single mental factor; and thus, by experimental means, we may measure directly the influence of single factors. In practice, however, such accurately diagnostic tests have been only approximated. The third method is that of correlation. Having measured a number of factors in a large number of individuals, the degree of correspondence between any two of the factors (technically called the index of correlation) may be mathematically computed and numerically expressed. A positive index means a tendency of the factors to vary directly with each other, unity expressing complete uniformity; a zero index means that the factors vary independently; and a negative index indicates a tendency of the factors to exclude each other.

Experimental work directly attacking the second main problem has for the most part borne upon the influence of heredity; the influence of age, sex, and other conditions has come to light rather incidentally in investigations undertaken with other purposes. The exact study of the third problem has hardly begun.

Consult: Kraepelin, *Psychologische Arbeiten* (Leipzig, 1896); Titchener, *Experimental Psychology* (New York, 1901); Stern, *Die differentielle Psychologie* (Leipzig, 1911), which contains an extended bibliography; Whipple, *Manual of Mental and Physical Tests* (Baltimore, 1914).

IN′DO-CHI′NA. A geographical term formerly designating the southeastern peninsula of Asia (Farther India), embracing Burma, Siam, French Indo-China, etc.

INDO-CHINA, FRENCH. See FRENCH INDO-CHINA.

IN′DO-CHI′NESE. The name applied as a general term to the great majority of the native population of Farther India, or Indo-China. It originally indicated that these peoples were related by speech and physical characteristics to the Chinese, but in part also somatically and culturally to the peoples of Hindustan. The Indo-Chinese peoples speak what are called tonic monosyllabic languages, forming, with the Tibetan and Chinese groups, the extensive and important Sinitic, or Tibeto-Chinese, stock or family. The chief Indo-Chinese peoples are the following: Burmese, Siamese, Annamese, Cambodians, Tonkinese, who have all in some respects reached the status of civilization. Related to the Siamese are the other Thaĭ tribes, Shans and Laos, who preserve (some of them, at least) the primitive type of the Thaĭ stock better than the Siamese and are likewise less civilized, though in the past they have created or have been the bearers of several half civilizations. The Cambodians, or Khmers, about whose linguistic and somatic relationship there is still some dispute, authorities crediting them with Aryan affinities especially as to physical characters, have behind them the more or less indigenous culture represented by numerous inscriptions and by the remarkable temples and monuments of Angkor-Vat, etc. The culture of the Indo-Chinese peoples has been largely influenced by both India and China, while the more primitive Malays have also had a not insignificant share in the physical and social complexes there existing. The Khmers have in earlier times borrowed not a little from Hindu sources, though this borrowing may not have been so great as has hitherto been assumed. The Burmese owe a good deal of their civilization to India; the Siamese almost as much, though more indebted to China than the Burmese; while the social life and culture of the Annamese is largely a reflection of Chinese. The Assamese of the Northwest, who speak an Aryan language closely related to Hindi, are probably a mixture of some of the more primitive tribes and Hindus. The exact relationship of some of the savage tribes of the northern parts of Farther India is not yet clear, but those not distinctly Thaĭ are more closely connected with the pre-Sinitic inhabitants of southern China and the Tibetan area. The Mois, by which general name a number of more or less primitive tribes scattered over the eastern mountains and tablelands are known, are an aboriginal race with perhaps a Caucasian strain. The Kuis of the Shan States are probably aboriginal, like the Mois; the Kuis of Cambodia have for some time been rapidly assimilating in speech and otherwise to the Cambodians. The Mons, or Talaing, of Burma, formerly had a much greater extension, but have been driven back by the more civilized peoples and the mixed races of modern origin. The Tchiam, or Chiam, who are the modern representatives of the people who founded the ancient Empire of Champa, are by some authorities thought to possess Malay linguistic affinities. The Karens of Burma, who have recently shown themselves to be so amenable to missionary influences, are related to the Burmese linguistically and physically, but are of a more primitive type. The numerous Chin tribes of the Northwest are probably closely related to the primitive Burmese, but some of them are of very mixed type. The Lushai tribes are perhaps similarly related in general; they, together with the Nagas of the mountains of Manipur, are now more or less mixed—some of them have been thought to have Malay affinities. The Indo-Chinese peoples as a whole are probably of Mongolian stock, with early and later admixtures of Aryans and non-Aryans from India, etc., Malays and possibly Negritos, besides interminglings with the more modern peoples of the Indo-Chinese area. Like Hindustan, Farther India has had a history of primitive occupation, indigenous culture evolutions, foreign conquests, native combinations and disputes, etc. The more civilized peoples have more or less exploited for agricultural, commercial, and labor purposes the less civilized; the Burmese and Siamese the

Shans, the Annamese the Mois, the Laos the wilder peoples of their country; and to this general exploitation the Chinese, whose coming into this area as colonists and traders antedates the Christian era, have added much. Back of the modern civilization of Burma, Siam, Annam, Cambodia, etc., lie older half civilizations of the more primitive tribes—Khmers, Shans, Laos, etc.—whose remains are of considerable importance and of great antiquity. Back of these, again, are the monuments of prehistoric man in this part of the world—the kitchen middens of Cambodia, the stone monuments of the Khasi country, etc., and, earliest of all, the chipped implements discovered by Noetling in 1894 near Yenangyoung, on the Irrawaddy, in Upper Burma, which are claimed to prove the existence of Tertiary man in this region. It is probably from some of the proto-Indo-Chinese or their closely allied predecessors that the Malayan stock has sprung. Some of the Indo-Chinese, however, exhibit closer somatic affinities with certain of the Mongolian natives of northeastern Asia, such as the Tchuktchi, etc. Consult: Von Helwald, *Hinterindische Länder und Völker* (Leipzig, 1880); Forbes, *Comparative Grammar of the Languages of Farther India* (London, 1881); Bastian, *Völkerstämme am Brahmaputra* (Berlin, 1883); Ehler, *Im Sattel durch Indo-China* (ib., 1894); H. C. Clifford, *Further India* (New York, 1904).

INDO-CHINESE SUBREGION. In zoögeography, a faunal district of the Oriental Region, comprising all that part of China south of the high mountains which carry the Himalaya Range eastward nearly to Foochow and form the watershed between the south coast and the valley of the Yang-tse; also all of Annam, Siam, Yunnan, Burma, and Assam, and a long, narrow extension westward along the southern slopes of the Himalaya, between the levels of about 2500 and 9000 feet. The name Himalayan or Himalo-Chinese is therefore sometimes given to this fauna and subregion. It is one of the richest faunas in the world and is especially distinct in its birds, of which more than 40 genera are peculiar, among which the pheasants are conspicuous. In the higher mountains Palæarctic forms mingle with it to some extent, but on the whole the affinities are distinctly Oriental. See Map under DISTRIBUTION OF ANIMALS.

IN'DO-EU'ROPE'ANS. A term frequently applied to the so-called Aryan race (see ARYAN; EUROPE), as being inhabitants of India and Europe. The word is, however, linguistic rather than ethnological. Even in linguistic parlance the term is no longer so frequently used by authorities, except among French and Italian scholars, having been replaced by "Indo-Germanic." See INDO-GERMANIC LANGUAGES.

INDO-GERMANIC LANGUAGES, often called INDO-EUROPEAN, ARYAN, or sometimes INDO-CELTIC. The name given to the great cognate group of tongues spoken by the kindred peoples of southern and southwestern Asia and Europe and extending from India as far as the people of Germanic blood have spread. (See ARYAN.) This great group is quite distinct from the Semitic family of languages, from the forms of speech spoken by the Mongolian tribes, and from the various other recognized groups of tongues which are distributed over the world. The question as to the situation of the primitive home of the Indo-Germanic peoples has been much discussed. The original Indo-Germanic habitat is now generally thought to have been in central or northern Europe rather than in Asia. Various theories have been advanced, especially a generation ago, to account for the present distribution of these languages. The genetic arrangement of the tongues in a genealogical tree by Schleicher and other scholars, or views as to migratory movements or dissemination, like Johannes Schmidt's "wave theory," will be found referred to in most books relating to linguistics and comparative philology. The present tendency is to regard these languages as the development of dialectal differences within the original Indo-Germanic mother tongue. In other words, the attempt is no longer made to "reconstruct" a unitary primitive tongue. On the other hand, the kinship of these languages has been scientifically proved by the family features and general likeness in their structure. In point of age they go back as far as the literary monuments of the Vedas.

The division of the Indo-Germanic peoples as represented by the various branches of speech is generally considered to be eightfold, as follows: (1) Indo-Iranian or Aryan proper, the ancient and modern languages of India and Persia; (2) Armenian, forming a sort of bridge between Asia and Europe; (3) Grecian or Hellenic, with its modern representatives in the tongues of northern Greece and the Peloponnesus; (4) Albanian, a more modern representative of the ancient Illyrian; (5) Italic, the Latin, with its modern descendants in the Romance tongues; (6) Celtic, or Keltic, originally occupying the west of Europe, but now confined chiefly to the British Isles, and of particular interest to the historical student of English and French philology; (7) Germanic, the important group to which the Anglo-Saxon, the English, the German, and other Teutonic tongues belong; and lastly (8), the Balto-Slavic group, the chief representative of which is the modern Russian. The various subdivisions of these language divisions, together with their branches or dialects, will be found under the respective titles. Besides these there are some sporadic traces or representatives of other Indo-Germanic idioms which are not included in the list because the fragments are too scanty or too scattered to allow a determination in detail of the real character of the speech. Such are the Phrygian, which has affinities with the Armenian, or again the Messapian, which may be connected with the Albanian, or, still further, the Macedonian, Gallic, Burgundian, or the like.

With reference to the general features, the Indo-Germanic languages are an inflectional group of tongues, sprung from a common ancestor no longer in existence. They have certain marked or distinctive features or variations of sound and accentuation that are more or less common to all, and they show a general similarity in structure as to roots, affixes, composite forms, with kindred variations of nouns, adjectives, pronouns, and verbs through eight cases, three numbers, including a dual, and a variety of moods and tenses, together with certain common phenomena in syntax and word order.

Bibliography. Fick and others, *Vergleichendes Wörterbuch der indogermanischen Sprachen* (Göttingen, 1890–1909); Brugmann and Delbrück, *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen* (Strassburg, 1897); Brugmann, *Kurze vergleichende Grammatik der indogermanischen Sprachen* (ib., 1902–04); Edmonds, *Introduction to Comparative Philology* (Cambridge, 1906); Meillet, *Les Dialectes indo-européens* (Paris, 1908); Delbrück, *Einleitung in das Studium der indogermanischen Sprachen* (5th ed., Leipzig, 1908); Meillet, *Introduction à l'étude comparative des langues indo-européennes* (3d ed., Paris, 1912). For the primitive Indo-Germanic period, consult: W. C. Ripley, *Races of Europe* (London, 1900); Schrader, *Reallexikon der indogermanischen Altertumskunde* (Strassburg, 1901); De Michelis, *L'Origine degli Indo-Europei* (Turin, 1903); Sophus Müller, *Urgeschichte Europas* (Ger. ed., Strassburg, 1905; Fr. ed., Paris, 1907); Hirt, *Die Indo-Germanen* (Strassburg, 1905–07); Schrader, *Sprachvergleichung und Urgeschichte* (3d ed., Jena, 1906–07; Eng. trans., 1890); Brunnhofer, *Arische Urzeit* (Bern, 1910); Feist, *Europa im Lichte der Vorgeschichte und die Ergebnisse der vergleichenden indogermanischen Sprachwissenschaft* (Berlin, 1910); Schrader, *Die Indogermanen* (Leipzig, 1911). See Aryan; Inflection; Language; Philology; Phonetic Laws; and also the articles on Albanian Language; Armenian Language and Literature; Celtic Languages; Greek Language; Indo-Iranian Languages; Italic Languages; Latin Language; Romance Language and Literature.

INDO-IRANIAN LANGUAGES. A branch or group of the Indo-Germanic family of languages. It comprises the Indo-Germanic languages of ancient and modern India, Ceylon, Persia, Afghanistan, Baluchistan, Kurdistan, and the Ossetic portion of the Caucasus. Although the vowel system is meagre, the consonants, generally speaking, best represent the pre-Indo-Germanic conditions. In inflection this group is the most primitive and highly developed of all the Indo-Germanic language divisions, while the most ancient literature in Indo-Germanic is preserved in Indo-Iranian. See Afghan; Avesta; Baluchi; Bengali Language and Literature; Ceylon, *Language and Literature;* Gujarati Language and Literature; Hindustani Language and Literature; Indian Languages; Indo-Germanic Languages; Iranian Languages and Literatures; Kashmiri; Kurdish; Maldive Language; Marathi Language and Literature; Naipali; Old Persian Language; Ossetic Language; Pali Language and Literature; Pahlavi Language and Literature; Panjabi Language and Literature; Persian Language; Prakrit Language and Literature; Sanskrit Language; Uriya Language and Literature.

INDO-MALAYAN SUBREGION. See Malayan Subregion; Indian Subregion.

INDONESIAN, ĭn′dō-nē′zhan (from Gk. Ἰνδός, *Indos*, Indian + νῆσος, *nēsos*, island). A term, coined in analogy with Polynesian, Melanesian, Micronesian, etc., used by certain ethnologists to denote certain peoples of the East Indies and Polynesia who are neither Malays nor Papuans, but Caucasian in type. Such authorities would include under this head the Eastern Polynesians, certain tribes of Sumatra, Java, Borneo, the Philippines, etc. The differences between the so-called Indonesians and the Malayan stock are, however, neither so important nor so significant as these writers claim, and there is good reason for looking upon the former as only a more primitive Malayan type, or proto-Malays. The Indonesians and Malays are probably closely related, the former being really primitive Malays. The term Indonesian was introduced by Logan, who attributed a Caucasian (Indian) origin to the lighter-colored natives of some parts of the East Indies, and extended in meaning by Hamy and others, who enlarged upon this theory. The term Indonesia is used by some authorities to designate the Malay Archipelago, or island group of the East Indies.

INDOOR BASEBALL. This sport varies but little from the regular game of baseball (q.v.). It originated at Chicago in 1887 and is credited to George W. Hancock and fellow members of the Farragut Club of that city. It can be played by from seven to nine players in any hall of size which will permit of sufficient light and room for the diamond and fielding, the minimum playing floor measuring 40 × 50 feet. The rules are designed to equalize the difference of size and surroundings from outdoor baseball, as are also the implements of the game. Each side of the diamond is from 27 to 35 feet long, according to the floor space at command. The ball must be not less than 16¾ inches nor more than 17¼ inches in circumference, must weigh not less than 8 nor more than 8¾ ounces, and must have a white cover. The bat must be 2¾ feet long and 1¾ inches in maximum diameter. The bases are 15 inches square, and half filled with sand or other heavy substance sufficient to anchor them in place, and the rules of the National Indoor Baseball Association of the United States govern the game. Consult *Indoor Base Ball Guide*, "Spalding's Athletic Guide" (New York, 1914, and annually).

INDORE, ĭn-dōr′. A native Mahratta state of the Central India Agency (Map: India, C 4). It is traversed from east to west by the Nerbudda River and also by the Vindhya Mountains, their loftiest point within its limits being 2500 feet above the sea. Area, 9469 square miles. It has large forests of valuable timber, in which are found many wild animals. Wheat, rice, tobacco, sugar cane, cotton, poppy, and maize are cultivated. Some cattle are raised, and opium is one of the chief manufactures. The state owns and rents out all the land. The Bhils, one of the wildest and most savage of the aboriginal tribes of India, inhabit Indore. Besides the capital of the same name (q.v.), the principal towns are Rampura, Mehadpur, Bhampura, and Mhow. Pop., 1901, 850,690; 1911, 1,004,569. The Mahratta ruler bears the name of Holkar (q.v.).

INDORE. The capital of the native Mahratta state of the same name, India, situated at the junction of the Saraswati and Khan rivers, 440 miles east of Bombay (Map: India, C 4). It is 1738 feet above sea level. Indore was founded in 1767 and contains the palace of the Holkar, the Daly College for sons of Central India chiefs, government offices, barracks, and a mint. It has a modern drainage system, a good water supply, and maintains a public lighting plant, market, reading room, and dispensary. It has manufactures of cotton and a considerable trade in grain, tobacco, opium, cloth, and metal vessels. A suburban district (pop., 1911, 9195), assigned by treaty, contains a British residency, the seat of an agent and his staff, and the government opium depot of Central India. Pop., 1901, 86.686; 1911, 44,947.

INDORSED, or **ENDORSED.** See Heraldry.

INDORSE′MENT (from ML. *indorsare*, to indorse, from Lat. *in*, in + *dorsum*, back). In its broadest sense, any writing on the back of an instrument. As a technical term of the law, it denotes the writing of the holder's name upon a bill of exchange, check, promissory note, or other negotiable instrument, on transferring it to another. While this writing is ordinarily on the back of such an instrument (whence its name), it is equally effective if made on its face or on a paper annexed to the instrument. In order to convert the writing into a contract, it must be delivered with the intention of giving effect thereto, or it must find its way into the hands of a bona-fide holder. The contract obligation of an indorser is to pay the indorsed instrument, provided payment is duly demanded, and payment is refused, and due notice of the dishonor is given to him. If the payee or holder simply signs his name, the indorsement is said to be in blank, and the subsequent holder may fill out the indorsement to any one as indorsee or transferee. A special indorsement is one which specifies the person to whom or to whose order the instrument is to be payable, e.g., "Pay C. D. or order. (Signed) A. B." When personal liability as indorser is to be avoided, the words "without recourse" are added. Such an indorsement does not prevent the further negotiation of the instrument or cast any suspicion upon its validity. A similar restriction is made in England in the case of checks by "crossing" them. An indorsement which restricts further negotiation is called a restrictive indorsement, e.g., "Pay Corn Exchange Bank only." It is provided by modern legislation that when an indorsement is conditional a party required to pay the instrument may disregard the condition and make payment to the indorsee or his transferee, whether the condition has been fulfilled or not. This changes the old rule, under which an acceptor or maker paid a bill or note with such an indorsement at his peril if the condition was not fulfilled. That was thought to be unduly hard upon the party required to pay. See BILL OF EXCHANGE; CHECK; NEGOTIABLE INSTRUMENT.

IN'DRA. The great national god of Vedic India. Although Indra lost his supremacy through the rise of Brahma, Siva, and Vishnu, he is still preserved as a figure in the Hindu pantheon. As represented in the *Veda* (q.v.), he is primarily the god of the lightning and thunder, with the attendant phenomena of the storm, wind, and rain; by vanquishing the demons of drought and darkness he restores the sun to the sky, the light of dawn, and the day. The realm of his activity is the atmosphere; and the many hymns of the *Rig-Veda* that are devoted to his praise—far outnumbering those to any other god—are rich in meteorological imagery and poetic allusions to natural phenomena. Armed with the thunderbolt (*vajra*), his special weapon, and inspired by copious drafts of intoxicating *soma*, his favorite beverage, he goes forth to do battle with the demons, especially Vritra, who, wrapped like a choking serpent about the clouds, has shut up the waters as prisoners. One of the hymns that describe this battle and the god's triumph over the dragon (*Rig-Veda*, 1. 32) is an epic in miniature. As the god of battles, Indra is looked upon in the historical hymns of the *Veda* as the royal patron of the victorious Aryans in their conflicts with the aboriginal inhabitants of India. His supremacy during the whole Vedic period is unquestioned; the more ethical and transcendental Varuna is no rival to his prowess.

In the later mythology a change takes place; Indra gradually sinks to a secondary rank among the gods. His installation as god of the lesser divinities is described in the *Aitarēya-Brāhmaṇa;* and from that time onward he becomes rather a figurehead in the pantheon, and the type of a mortal king, than the former supreme lord of heaven. The Epic and Puranic periods distinctly show that he has ceased to enjoy the worship accorded him in Vedic times. He remains ruler of the atmosphere, it is true, and one of the eight world guardians, regent of the eastern quarter of the sky, wielding his thunderbolt and sending down rain, but his real power is gone. Instead of descriptions of him as the great god of battles, praises are lavished on the delights of his paradise or heavens, *Svarga*, with its heavenly musicians and enchanting nymphs, the *Gandharvas* and *Apsarasas*, and all the joys of this happy abode of the gods, faithful worshipers, and heroes slain in battle. Like the later writings, the epics bring to view the sensual side of Indra's character in his amours with Ahalya, the wife of a sage—a bit of scandal as old as the Brahmanas. In consequence of the curses of the outraged seer, the god was doomed to lose his virile power; the conqueror Indra ceases to be invincible; even a son of the demon Ravana vanquishes him, as told in the *Rāmāyaṇa*, and wins the title *Indra-jit* (victor over Indra) for his prowess. The *Purāṇas* likewise describe him as worsted by the rising god Krishna, an incarnation of Vishnu, and they name various successors of Indra as rulers in the different *manvantaras*, or ages of the world.

Among the Hindus at present Indra is little worshiped. In Bengal a single day of the year is consecrated to his service, and, on occasions of drought, he is prayed to in other parts of the country. In Nepal, too, his annual festival (*Indra-jātra*) is the occasion for processions and dances. Nevertheless Indra the mighty is no more. His golden chariot in the *Veda* is now replaced by an elephant on which he is generally represented as riding, and the thunderbolt is grasped in his hand. The face and body are sometimes portrayed as covered with figures resembling eyes, into which they are said to have been mercifully transformed from the thousand vile marks that came out upon his person in consequence of the curse brought upon him for his incontinency with Ahalya. (See HINDUISM.) For a full description of Indra during the Vedic period, consult: Perry, "Indra in the *Rig-Veda*," in the *Journal of the American Oriental Society*, vol. xi (New Haven, 1880); Macdonell, *Vedic Mythology* (Strassburg, 1897); Bloomfield, "The God Indra and the Sāma-Veda," in *Wiener Zeitschrift für die Kunde des Morgenlandes*, vol. xvii (Vienna, 1903); id., *Religion of the Veda* (New York, 1908). For the later Indra, consult: Dowson, *Hindu Mythology* (London, 1879); Hopkins, *Religions of India* (Boston, 1895): Wilson, *Hindu Mythology* (new ed., London, 1900). See Plate of Hindu Deities in article INDIA.

INDRANI, ĭn-drä'nē (Skt. *Indrāṇi*, Indra's wife). A name of the wife of the Hindu god Indra (q.v.) in the *Veda*. She is called Saci or Andri in the later legends.

INDRE, ăɴ'dr'. A river of France, rising on the northern border of the Department of Creuse (Map: France, N., G 6). It flows northwest through the departments of Indre and

Indre-et-Loire, past the towns of La Châtre, Châteauroux, and Loches, and joins the Loire 17 miles below Tours, after a course of 136 miles, for the last 40 of which it is navigable for small craft.

INDRE. A central department of France, the western portion of the old provinces of Berry, Orléanais, Marche, and Touraine, lying immediately south of the Department of Loire-et-Cher. Area, 2664 square miles, of which about four-fifths are in tillage and pasture (Map: France, N., G 6). Pop., 1901, 290,216; 1911, 287,673. The chief rivers are the Indre, the Vienne, the Creuse, and its tributary, the Anglin. The surface falls naturally into three parts, Boischaut, Champagne, and Brenne. The first two are level and fertile; the last was formerly marshland, but has been largely reclaimed. There are large crops of wheat and barley, but the principal resources of the department are its vineyards and its flocks. The principal manufactures are woolen and linen cloths, hosiery, scythes, paper, and porcelain. Iron mines are worked. Capital, Châteauroux.

INDRE-ET-LOIRE, ă lwär. An inland department of France, part of the ancient provinces of Touraine, Orléanais, Pitou, and Anjou, lying northwest of the Department of Indre (Map: France, N., F 5). Area, 2377 square miles, of which more than one-half is arable. Pop., 1901, 337,916; 1911, 341,205. The department is watered by the Loire, the chief river, and by its tributaries, the Cher, the Indre, and the Vienne, all of them navigable. In the south, or Brenne district, the surface is hilly, but in the other parts it is undulating and fertile. Cereals are grown, but wine is the most important product. The chief manufactures are bar iron, woolen cloth, silk, rope, paper, and leather. Capital, Tours.

INDRI, ĭn′drĭ. A large, monkey-like lemur (*Indris indris*), of Madagascar, which is regarded as the most highly organized of the tribe and differs from other lemurs in several important particulars, such as having only 30 teeth, the large size of the hind limbs as compared with the fore limbs, the webbing of the toes, and the fact that only one offspring is produced annually. The coat is variable black and white curiously contrasted, and the ears look like hairy tufts. Unlike most lemurs, the indris are wholly diurnal, going about in the forests of the east coast, to which they are confined, in small parties, and subsisting mainly on fruit. Their voices are loud, and when angry or hurt the animals utter piercing shrieks or mournful cries. These howlings and other characteristics have led to many native superstitions in regard to the indri, which alone constitutes a subfamily of the Lemuridæ. See Plate of LEMURS.

INDUCED ELECTRIC CURRENTS. See ELECTRICITY; INDUCTION.

INDUCED MANIA. See IMITATIVE INSANITY.

INDUC′TANCE. See INDUCTION, 2.

INDUC′TION (Lat. *inductio*, inference, from *inducere*, to lead in, from *in*, in + *ducere*, to lead). The logical process of arriving at general principles from particular facts. In order to understand any fact or event, we need not only to be able to know its sensible qualities or constituents, but also to know in what relation it stands to other facts or events. Such relation is a general character, or, as it is called in logic, a universal relation. If, using some already discovered relation between some objects as a point of departure, we assume such a relation to exist between other similar objects, we are said to generalize or to make an induction. Induction may thus be defined as the universalizing of perceived relations or connections between objects. Among these relations one of the most important is that of antecedence and consequence. (See CAUSALITY.) This universalization is corrected or confirmed by further observation of these connections in other individual cases until at last often a valid judgment asserting unconditional connection is reached. Such a judgment is said to be valid when no known fact is at variance with it, but such a validity is theoretically always provisional; practically it has complete assurance. A valid induction is one which, starting from particular observations, thus reaches a valid universal judgment. Scientific inductions do not differ in principle from the naïve inductions we have already described; the difference is one of method employed, not of kind.

Looking now at inductions ascertained to be valid, we discover three stages in the process of arriving at certified results. The first stage is called *preliminary observation*. At this point actual coexistences and sequences or other relations are observed and form the data for the induction. The second stage consists in the generalization of some actually ascertained coexistence or sequence, or other relations. This is *induction* proper. The third stage is *verification*, the correcting or confirming of the validity of the generalization by further observation. Frequently the term "induction" is used to include all these three steps; in this case the second step is called generalization. Let us now take up these three steps in order.

I. Preliminary observation may be quite casual and accidental, or it may be intentional. A person may happen to see some connection between phenomena, or he may be intently looking for connections. In the latter case the observer may simply look at things as they offer themselves to his notice, or he may set about to interfere with the spontaneous course of events in order that he may the better observe the connection. The latter sort of observation is called an experiment. When experiment is possible, it is usually of great assistance in collecting data for generalization. Indeed, almost all the great advances in modern science have been due to experimentation rather than to mere observation. In intentional observation, whether it be simple or experimental, it is extremely important for the observer to know what he is to look for. Not every detail in the complex of details under observation is pertinent to the matter in hand; and yet no a priori rules can be given to direct an investigator. Much depends on experience and skill not subject to rules. But by analyzing successfully conducted inductions resulting in valid inductions, logicians are able to formulate several important rules of procedure, which thus are a posteriori. For our present purposes we can do no better than quote John Stuart Mill's canons of induction. These state the conditions under which generalization may be made. Hence the observer should be on the watch for the occurrence of these conditions.

The canons are as follows: First Canon, for the Method of Agreement: *If two or more* *instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause* (*or effect*) *of the given phenomenon.* Second Canon, for the Method of Difference: *If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former, the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.* Third Canon, for the Joint Method of Agreement and Difference: *If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance, the circumstance in which alone the two sets of instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.* Fourth Canon, for the Method of Residues: *Subduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents.* Fifth Canon, for the Method of Concomitant Variations: *Whatever phenomenon varies in any manner wherever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.* In all these cases what Mill calls a "circumstance" is assumed to be the cause if it precedes, and an effect if it succeeds, the "phenomenon." These are statements of the conditions under which scientific men make inductive inferences. Hence in our observations for the purposes of induction we should keep the following questions in mind: Is it the case that any instance in which the phenomenon under investigation occurs, and any instance in which it does not occur, have every circumstance in common save one? Is it the case that two or more instances of the phenomenon under investigation have only one circumstance in common? Is it true that two or more instances in which the phenomenon under investigation occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance? Is a part of this phenomenon under investigation known to be the effect of certain causes? Does the phenomenon under investigation vary in any manner whatever whenever some particular circumstance varies in some particular manner? In case any of these questions can be answered in the affirmative, an induction may be made. It must not, however, be supposed that an investigator sets about his work with only such general clews as are furnished by these questions. In any particular investigation a knowledge of exactly what has already been done by previous workers is indispensable. If he has this knowledge, the investigator is in a position to ask much more definite concrete questions than the five we have just mentioned. But, however much more definite his problem may be, it may always be reduced to general expression, and when so reduced it will assume the form of one of the five questions stated above, which give the headings for the treatment of the methodology of observation. Any more specific methodology can be worked out only on the basis of the practical experience of the expert in any particular line of research.

II. It has already been said that when any one of the five questions given in the last paragraph can be answered in the affirmative, we universalize the actually observed relation between phenomenon and circumstance. But now it will probably be asked what warrant there is for this universalization. The answer is somewhat as follows: To universalize is a natural, an instinctive tendency of thought. The child jumps at conclusions in very much the same way as the kitten jumps at a moving string. What the child does, the ordinary adult also does, and unless corrected by experience the probability is that every one would generalize every observed relation. But experience does check the tendency in a measure. The child who generalizes the observed connection between shape and reboundingness, or color and reboundingness, comes by later experience to find that his generalization is invalid. The truth of the universal judgment implied in his expectation is not borne out by later developments. But he is nowise daunted. He proceeds to generalize some other observed connection until at last he gets *a general law which is uncontradicted by experience*, and which he therefore accepts as true. The first generalizations are naïve, instinctive attempts to find uniformity in the world of experience. The attempt in any particular direction may be baffled, but only to be followed by an attempt in another direction. In other words, some attempts fail and others succeed. To succeed is to find that subsequent experience conforms and continues to conform to the expectation aroused by previous experiences. To fail is to find that subsequent experience disappoints this expectation, while in either case the expectation is, from the point of view of logic, an unreflective generalization. In later life consciousness becomes reflective; it looks back upon its own processes and finds that in cases of successful generalization certain conditions are present, while in cases of failure these conditions are absent. The same instinctive generalizing tendency which led to the generalization of the earliest connections discovered, now leads to the generalization of the connections between successful generalization itself and *the conditions under which the success is achieved.* These latter generalized connections are logical laws of thought. We now are in a position to see that there are two kinds of laws of thought, logical laws and psychological laws. The psychological laws are those which express the modes of thought behavior, whether the results of the behavior be ultimately satisfactory or not. The logical laws express the conditions under which the results of thought behavior are ultimately satisfactory to the thinker. Thus, it is a psychological law that an immature thinking consciousness generalizes instinctively, i.e., without any foresight of the results to be gained; it is a logical law that if the generalization is to be valid it must be made only under certain conditions, such as those stated in the five canons mentioned above. This logical law is itself validated by the fact that it is a generalization made in conformity with the law of which it is itself the expression. In other words, it is self-consistent and also consistent with all the known facts. A more stringent test of the validity of any law seems to be impossible. If now it is further asked whether we know that the thought which conforms to the laws of thought thus discovered will continue to be successful in the future as it has been in the past, we can answer by saying that we have only one plausible reason to suppose it should not be successful, while every other reason that we know would lead us to believe that it will be successful. That one exception is the fact that in past experience, when we thought that we had discovered laws, we often found that we were in error. Hence it may be reasoned that it is possible that we may be in error now as to the logical laws of thought. But this argument has not the force that at first sight we might be tempted to ascribe to it. If we know that in the past we thought wrongly in many instances in which we thought that we were right, and if we now generalize this knowledge and say that therefore on the same principle we may now be in error and may always be in error, we are making an uncriticized induction; and such inductions our past experience has proved to us to be very precarious. If now our generalization as to the valid laws of thought is made in conformity with conditions lack of conformity to which made other inductions invalid, then the invalidity of those other inductions is no reason for attributing invalidity to these laws of thought. Past errors in induction should indeed make us very circumspect. We should use our utmost endeavors to avoid the causes which misled us; but having avoided the causes, we need not be timid as to the validity of an induction which in the past has never been impeached by experience, but, on the contrary, has been verified time and time again. A persistent objector may still argue that the fact of our having made errors in the past is still a good reason for doubting the validity of all inductions, and therefore for doubting the validity of the laws of thought which we have discovered by induction. A man who argues thus exposes himself to a valid form of the *argumentum ad hominem.* (See ARGUMENT.) He obliges us to remark that he assumes for the purposes of his argument the validity of the law he is assailing. He is assuming the right to generalize from experiences of error in the past. What he thus does he may not consistently decline to let others do. And further, he is generalizing from experiences of error and ignoring the experiences of success in valid induction, while his opponent discriminates between the two cases and bases his faith on the discrimination. In other words, the skeptic is credulous with regard to the possibility of error and incredulous only with regard to the possibility of truth. What is an appeal to the fact of past error in proof of the fallibility of all laws of thought? It is nothing but an *induction* from past experience. The correctness of the conclusion of this induction would carry with it the invalidity of all argument by induction, and therefore the invalidity of this argument which seeks to prove by induction the correctness of the conclusion. Here as elsewhere (see KNOWLEDGE, THEORY OF) we see that one cannot reason against the laws of reason without putting one's self out of court. In the last resort, however, all belief in general laws is an assumption.

III. Verification of an induction consists in testing it in new instances. Any newly made induction is presumably based on a limited experience, and it needs to be examined in its bearings upon other parts of experience. The question in the mind of a person verifying an induction is this: Does the universalized relation prove its universal character in all our experience so far as this experience is pertinent to the relation at issue? This question can be answered only by looking at our past experience and by getting further pertinent experience. No verification of a true universal can be exhaustively completed; but, as we saw under II above, it may be practically conclusive. There may be no reason left for doubting a proposition except the bare possibility that it may not be true in cases as yet beyond our ken, but a bare possibility is always an unreasonable possibility.

The relation of induction to deduction is treated under DEDUCTION. The question whether any general proposition can be arrived at without induction has often been affirmatively answered. (See A PRIORI.) But the tendency at present is to regard all general knowledge as the result of induction. Recent logic tends to be empirical. (See KNOWLEDGE, THEORY OF.) For instance, the geometrical axiom that things equal to the same thing are equal to each other is by empiricism regarded as derived from experience by induction. It is first seen in individual instances that individual things equal to the same individual thing are equal to each other. This relation is then universalized. So with the arithmetical judgment: "Two and two are four." Hegel and J. S. Mill are the great logical protagonists of this view. Mill's statement of the view is more familiar than Hegel's, but it is defective in that it is based on an atomistic view of experience (see ATOMISM), a view which makes against the validity of induction by reducing all induction to mere simple enumeration (*inductio per enumerationem simplicem*), or a bare telling off of isolated findings, and a summation of the results of these findings into a collective statement.

Consult the authorities referred to under LOGIC; especially to be named here are the logics of Hegel, J. S. Mill, Bain, Minto, Jevons, Ueberweg, Lotze, Wundt, Sigwart, Bradley, Bosanquet, Hibben, Bode, and Creighton; also Hobhouse's *Theory of Knowledge* (London, 1896); A. Schuyler, *Critical History of Philosophical Theories* (New York, 1913).

INDUCTION. If an electrified body is brought near an uncharged one—either conductor or nonconductor—the latter will exhibit electrical forces; it is said to be charged by induction. In general, if a charged body is surrounded by a uniform medium, such as air, and if a body of any other material than that of the medium is introduced, thus making the surrounding medium heterogeneous, there will be induced charges on the body introduced. The question as to the character of the charges on this body and their distribution depends upon the relative electrical inductivity of the body and the surrounding medium. (See ELECTRICITY.) Similarly, if there is a magnet surrounded by a uniform medium, such as air, and if a body of a different kind of material from the medium is brought near the magnet, it will exhibit magnetic forces and is said to be magnetized by induction. The character and distribution of this induced magnetization depend upon the relative magnetic inductivity of the medium and the foreign body. (See MAGNETISM.) If the body which is introduced is iron or any magnetic body, and if the medium is air, the induced magnetization is such as to produce attraction by the magnet; if bismuth is introduced, there will be repulsion. Electromagnetic induction is the phenomenon observed when the magnetic field of force included by a conducting circuit is altered in any way, viz., electric currents are produced in this circuit. These induced currents are due to the *changing* of the field of magnetic force and are in such a direction as to tend to neutralize the change; they last only so long as the field is changing. See ELECTRICITY.

Tubes of Electric Induction are tubes which can be imagined drawn in the medium surrounding electrified bodies by choosing any small closed curve in this medium and drawing lines of force through each point of it. A hollow tube is thus made which has one open end on a positively charged body and the other on one negatively charged. If this tube is made of such a cross section that it includes unit electrostatic charges as its two ends, it forms a Faraday tube.

Tubes of Magnetic Induction are tubes formed in the same manner in the field around magnets by drawing lines of magnetic force through the points of any small closed curve. Faraday conceived the idea of these tubes being continuous through magnets and all bodies, not ending on any surface; they form, therefore, closed circuits, like a rubber tube with the two open ends brought together. The tubes are conceived to be of such cross sections that the number leaving a north pole of unit strength is 4π, where $\pi = 3.1416$. See MAGNETISM.

Owing to an electric current in a closed circuit, there is a magnetic field of force inclosing it; the tubes of magnetic induction form closed curves around the conductor. The *coefficient of self-induction*, or the *inductance*, is the number of these tubes threading through the circuit when there is a unit current in the conductor. Some of these tubes of magnetic induction may also in their paths pass through a neighboring closed conducting circuit, and the number of those tubes which do so when there is a unit current in the first circuit is called the *coefficient of mutual induction* of the two circuits. It may be shown that if there is a unit current in the second circuit, thus producing tubes of magnetic induction of its own, the number of these which thread the first circuit is the same as in the last case. The coefficient of self-induction depends upon the shape of the circuit, the number of turns of the conducting wire, and on the surrounding medium; and the coefficient of mutual induction depends upon these properties for each circuit and upon their relative positions. If L is the coefficient of self-induction for a single turn of wire, and if there are n turns in the coil, the coefficient is n^2L. Similarly, if in one coil there are n_1 turns and in the other n_2 turns, the coefficient of mutual induction is proportional to the product n_1n_2. If the two coils are so placed that the currents in them are "parallel," the coefficient of mutual induction is positive; if the currents are in opposite directions, the coefficient is negative. It can be shown that inductance plays the same part in the phenomena of electric currents that inertia or mass does in the motion of matter. The practical unit of induction is the henry (q.v.).

INDUCTION BALANCE. An instrument to determine the presence or character of a piece of metal, which may be either concealed, as a bullet in a human body, or in the form of a counterfeit coin or alloy. It was originally devised by Dove in 1841, but was improved and constructed in a serviceable form by Hughes in 1879. It consists of two sets of induction coils in which the primaries are connected in a circuit that includes a battery and a microphonic or other circuit breaker, while the secondaries are in connection with a telephone used by the observer. The current traverses the primary coils in opposite directions, and the secondary coils are so arranged that the sound of the microphone or circuit breaker is not heard, owing to the inductive effect being neutralized completely. If a coin or other metallic substance is introduced into the vicinity of one of the pairs of coils, this equilibrium will be disturbed, as part of the induction acts upon the metal and gives rise to induced currents. This of course produces an audible sound in the telephone. The instrument has been used to measure hearing, and it then is known as an audiometer, the perception of sound being tested by altering the positions of the coils. An arrangement of the induction balance was devised by Prof. Alexander Graham Bell to locate a bullet in the human body, and apparatus based on the foregoing principle was employed and numerous different forms made and tested. It was used in an attempt to discover the bullet by which President Garfield was killed, but the presence of the metallic mattress interfered with the operation of the instrument. Instances, however, of its successful use are on record. This method, employing modern apparatus, was suggested for use in European hospitals during the Great War of 1914, and its possibilities were thoroughly discussed. Consult Bell, "Induction Balance," in *American Journal of Science* (New Haven, 1883), and Hopkins, *Experimental Science* (New York, 1890).

INDUCTION COIL. A form of electrical apparatus used for transforming an interrupted current of low potential or pressure into one of high potential and alternating in direction. The fundamental fact of electromagnetic induction was first stated by Michael Faraday in a paper presented to the Royal Society on Nov. 24, 1831, in which he derived the conclusion that any change in a magnetic field will induce an electric current in a conductor situated in it. This basic principle of electromagnetic induction underlies the construction and operation of the induction coil. As regards its construction, it consists of four essential parts: a bundle of soft iron wire, *AA* (Fig. 1), called the core; the primary coil, *BBBB*, of insulated copper wire wound on the iron core, which is usually made of comparatively large wire and short in length; a much larger secondary coil, *CC*, of longer, finer copper wire; and a device, *D* (Wagner's

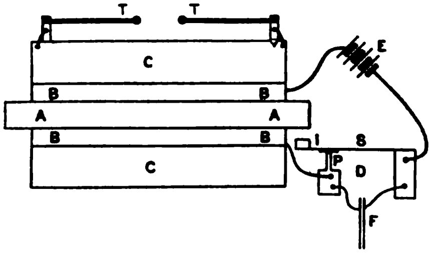


FIG. 1. DIAGRAM OF INDUCTION COIL.

hammer, 1839), called the rheotome or interrupter, which alternately makes and breaks the connection of an electric current through the primary coil. In dimensions they vary from a few inches in length and a fraction of a pound in weight to those of large dimensions used for wireless telegraphy.

The operation of the apparatus is as follows: The small spring *S*, being in contact with the point *P*, allows the current from the battery *E* to flow through the primary coil, converting it and its core into a powerful electromagnet. The production of this powerful magnetic field in and around the secondary coil induces in it a momentary current of high potential and opposite in direction to the primary. This secondary current is usually able to pass as a spark between the terminals of the secondary *TT*. When the core *AA* becomes magnetic, it attracts the piece of soft iron *I* on the spring *S* and draws it up, thereby breaking the connection between the spring *S* and the point *P* and interrupting the flow of current in the primary. Thereupon the electromagnet *AB* loses its magnetism, and, ceasing to attract the iron *I*, the spring returns to its original position, restoring the contact between *S* and *P* and again starting the current in the primary. The disappearance of the magnetic field on breaking the primary circuit induces a momentary current of high potential in the secondary coil in the same direction as the primary current, and hence in the opposite direction to the current induced in the secondary upon starting the current in the primary. The above cycle of operations repeats itself periodically, at a rate depending upon the spring *S*. Many modifications of the interrupter are used —some attached directly to the coil, as above described, some operating independently but still electromagnetically, others driven by an independent motor and purely mechanical, and still others of an entirely different type known as electrolytic interrupters.

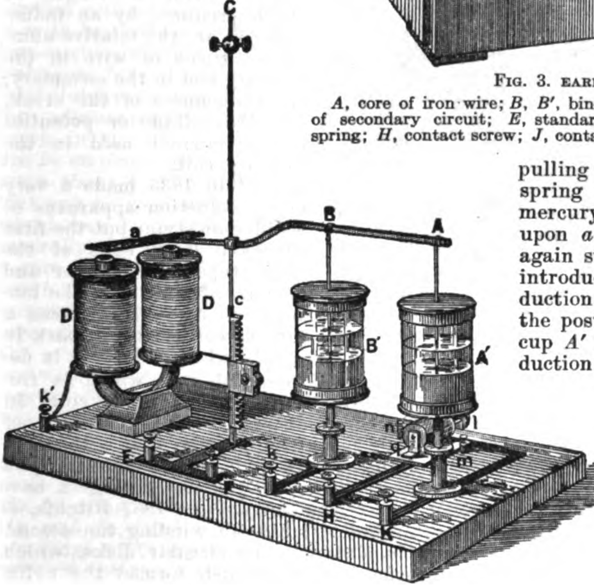


FIG. 2. FOUCAULT INTERRUPTER.

Figure 2 illustrates an early form of mercury interrupter due to Foucault. One circuit runs from the binding post *k′* through the magnet *D*, pulling down the armature *a* supported by the spring *c*, and lifting the wire *B* out of the mercury cup *B′*, interrupting the current, whereupon *a* springs up and *B* enters the mercury, again starting the current. This device may be introduced into the primary circuit of an induction coil, or the latter may be connected to the posts *F*, *H*, *K*, so as to use the wire *A* and cup *A′* for interrupting the current for the induction coil, while *B′* operates to keep the apparatus in motion. A commutator consisting of a hard rubber cylinder with metal contact pieces is shown at *I*, with binding posts at *n* and *m*. Figure 3 shows another form of interrupter attached to an early form of induction coil. Figure 4 shows a modern coil, with independent mechanical interrupter, capable of giving a 46-inch spark. In this an electric motor revolves a disk built up of conducting and insulated segments upon whose periphery a brush bears and makes and breaks the circuit.

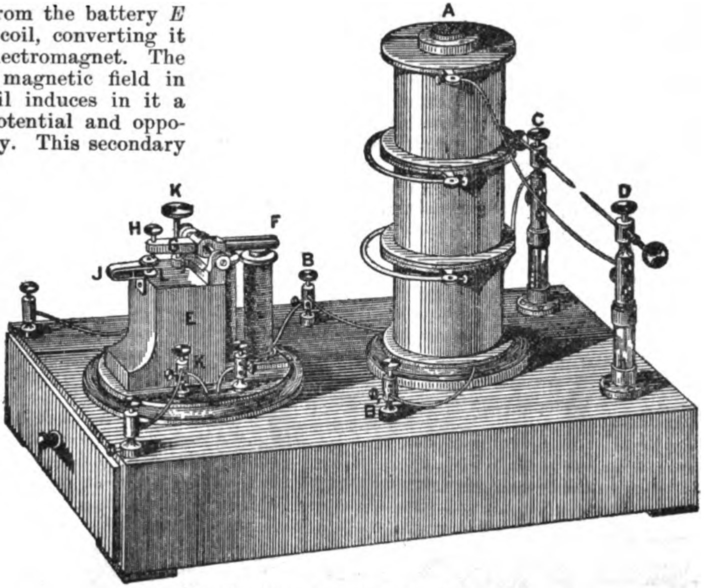


FIG. 3. EARLY RITCHIE INDUCTION COIL.

A, core of iron wire; *B*, *B′*, binding posts of primary circuit; *C*, *D*, binding posts of secondary circuit; *E*, standard carrying interrupter; *F*, armature; *G*, tension spring; *H*, contact screw; *J*, contact spring; *K*, binding post; *L*, contact point.

The mercury-jet interrupter is another type where a cylindrical block of steel, mounted on a vertical shaft and with its lower end immersed in mercury, has a vertical hole drilled part way through it and a lateral hole connecting with the vertical. On revolving the block rapidly, the mercury is drawn up through the vertical hole and then out of the lateral opening in the form of a jet, which impinges on a copper plate placed so as to be part of a circuit, which is closed on the passage of the jet from the block to it. Accordingly the circuit is completed when the jet impinges on its target, and the number of interruptions may be controlled by the speed of the motor rotating the steel block. To prevent oxidation of the mercury, the revolution may take place in oil, alcohol, or coal gas. A modification of this device in a coal-gas atmosphere does away with the independent electric motor by providing an armature, acted upon by a coil, which serves to rotate the block and keep the pump in operation. There are various modifications of this and other types of mercury interrupters.

Quite distinct from the types of interrupters just described are the electrolytic interrupters, of which that invented by Dr. Wehnelt in 1899 is most frequently used. This consists of two fixed electrodes immersed in a bath of dilute sulphuric acid, containing about 20 per cent of acid. The anode is formed by a small platinum wire insulated by glass or porcelain, except at its extremity, while the cathode consists usually of a sheet of lead. Where the continuous electromotive force is applied to a circuit containing such an electrolytic cell and an inductive resistance, the resulting current is not continuous but is intermittent, several hundred interruptions occurring per second. For example, with 24 volts impressed upon a primary circuit, 450 interruptions per second will be secured when the electrolyte is circulated. No primary condenser is required in such a circuit, but there must be sufficient inductance. The resulting spark at the secondary is of a different character from that given by the hammer break. Modifications of this device have been introduced by Caldwell and Campbell Swinton. The electrolytic break has been used in connection with X-ray and electrotherapeutic apparatus, but has not been found as useful in radiotelegraphy.

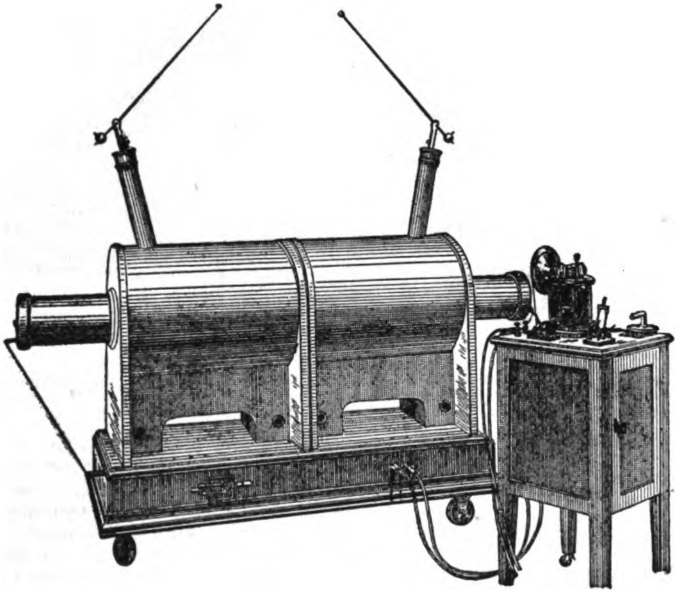


Fig. 4. A modern induction coil.

In some cases an alternating current is used in the primary without an interrupter, as in the case of the Tesla coil, where an electromotive force of high frequency is required. Here there is a primary winding of a few turns, having a spark gap and shunted by a condenser. The alternating current of from 5000 to 10,000 volts sent through the primary charges the condenser until the voltage across the air gap breaks it down and the condenser is discharged. Accordingly an oscillating current is produced in the primary winding, which with the secondary is wound on an air core, and this induces a high-frequency electromotive force in the secondary which is sufficient to break down a long spark gap. When used with an alternating current the induction coil becomes practically a transformer, and the action is essentially the same as in apparatus of this class. See Transformer.

The quantity of electricity moved at the break is equal to that moved at the make in the primary circuit; but, owing to the fact that the magnetism in the core vanishes much more rapidly at the break than it builds up at the make, the effect at the break is more compressed, and the potential, or electrical pressure, much greater than at the make. The suddenness of the break is of the greatest importance, and most of the improvements in interrupters have been designed to make the break as sharp as possible. The important factors which affect the potential or length of spark produced by an induction coil are the relative number of turns of wire in the primary and in the secondary, the suddenness of the break, and the voltage or potential of the current used in the primary coil.

Pohl in 1835 made a very crude induction apparatus of a different style; but the first to make large coils of the above type were Stöhrer and Ruhmkorff, and from the latter, who in 1851 produced a famous coil giving a spark in air 2 inches in length, is derived the name Ruhmkorff coil, which is frequently used as a synonym of induction coil. In 1855 Poggendorff increased the suddenness of the break by so arranging the device that the interruption occurred under an insulating liquid or in vacuo. (The cups *B′*, *A′* in Fig. 2 have alcohol over the mercury.) In 1857 Ritchie, of Boston, devised a means of winding the secondary coil in sections, like circular disks, which, laid together and connected, formed the cylindrical coil. This obviated to a great extent the danger of a spark jumping across from one turn of the secondary to another through the insulation. Ruhmkorff was so impressed with the superiority of a Ritchie coil exhibited in Paris that he adopted the Ritchie method of winding, and it prevails at present. Poggendorff proposed, and in 1853 Jean tried with good success, the use of a liquid as the insulation of the secondary, and at present most of the high-potential coils use liquid insulation. The advantage lies in the fact that, if a spark should jump over, the hole in the insulation would immediately close. Fizeau suggested a decided improvement in 1853, introducing a condenser at the break, as shown at *F* (Fig. 1). This enables the extra current of the primary to run into the condenser for an instant, while the points *S* and *P* are first separating, and by the time that *F* is charged *P* and *S* are too far apart for the current to jump across. This gives an oscillatory electromotive force in the secondary winding and increases its value.

In 1869 a coil was built for the London Polytechnic Institute the core of which was 5 feet long, 4 inches in diameter, and weighed 123 pounds. The primary had 6000 turns of wire 0.095 inch in diameter and 3770 yards long, weighing 145 pounds. The wire of the secondary was 0.015 inch in diameter and 150 miles long. This coil gave a spark 29 inches long, while the modern coil shown in Fig. 4 gives a spark 46 inches long.

The induction coil is especially used in the study of the electric discharge in rarefied gases, as in Geissler, Crookes, and X-ray tubes; also in electrotherapeutics, for automatic gas lighting, gas-engine ignition, X-rays, and wireless telegraphy. Although transformers have supplanted the induction coil in the best X-ray laboratories, it still holds an important place in wireless telegraphy, though here also it was by means of such a coil that Heinrich Hertz carried out his brilliant researches which led to the discovery of electric waves, thus confirming the great theoretical hypothesis of Maxwell and laying the foundation for wireless telegraphy.

The size, design, and construction of an induction coil depend upon the purpose for which it is to be used; i.e., the ignition coil of a gasoline engine is much smaller and simpler than a coil used for the production of electric waves in radiotelegraphy or X-rays (q.v.). When used for radiotelegraphy, a coil capable of a 10-inch spark in the air gap of its secondary circuit can be employed most advantageously and represents about the largest apparatus of this type that can be used for this purpose. Such a coil would have a primary circuit of thick wire, generally No. 12, wound in 300 or 400 turns on a core formed by a bundle of soft iron wires about 2 inches in diameter and about 18 inches in length. The primary is inclosed in an ebonite tube slightly in excess of 2 inches in diameter. The secondary winding is usually of No. 36 copper wire covered with silk and aggregating a length of 10 to 17 miles. The secondary is wound in a large number of coils or sections between paper or ebonite disks, the ends of the various coils being connected together. The whole secondary coil is immersed in melted paraffin to exclude air and provide adequate insulation and is usually finished by being inclosed in a case of thin ebonite, with ends and supports of the same material. Some form of interrupter is provided, and a condenser is placed across the gap. Various modified forms of induction coil have been designed to secure advantages of one kind or other.

As employed in wireless telegraphy, a 10-inch induction coil takes a mean primary current of about 10 amperes and requires from 16 to 20 volts supplied from a battery or storage cells—in other words, about 150 watts or 0.2 of a horse power are required, which will afford sufficient energy for radiotelegraphy up to a distance of 100 miles. Beyond this point, however, more power is required, and some form of alternating current transformer must be used, as described under WIRELESS TELEGRAPHY.

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INDUCTION MOTOR. See DYNAMO-ELECTRIC MACHINERY.

INDUCT'OPHONE (from *induct* + Gk. *φωνή, phōnē*, voice). A form of apparatus consisting of coils of wire and a telephone receiver, designed to afford communication between moving trains and stations. The apparatus and system were devised by Willoughby Smith, of London, in 1882, but never have been practically applied. Signals were transmitted inductively from coils of wire placed along the line to other coils in the train and received by means of a telephone.

INDUL'GENCE (Lat. *indulgentia*, indulgence, from *indulgere*, to indulge). A term of Roman Catholic theology, signifying the authoritative remission of temporal penalties due to sin, the guilt of which has been forgiven. An indulgence is not a permission to sin nor a pardon for future sins. It does not remit guilt; only sacramental absolution avails for that; but it affects the punishment which would otherwise be inflicted in the regular exercise of ecclesiastical discipline. According to Bellarmine's statement, one who has been absolved from guilt in the sacrament may be released from penalty by an indulgence. It is an act, not of "order," but of "jurisdiction," based upon the power of the keys. (See KEYS, POWER OF.) So complete is this power held to be that the efficacy of an indulgence is believed, in a true sense, to satisfy divine justice, as well as to secure the remission of temporal penalties, whereby it is made to extend beyond this present life into the state of purgatory. The ground of this satisfaction is sought in the treasure of merit laid up by Christ and the saints, and always at the disposal of the Church whenever need requires. This *thesaurus meritorum* is fundamental to the fully developed theory of indulgences. The clergy are its duly appointed custodians; its beneficiaries are the adherents of the Church throughout the world who avail themselves of its virtues; the indulgence is its channel of communication.

The history of indulgences begins with Roman law, where the word *indulgentia* means the remission of a punishment or of a tax. From legal usage the word easily passed into ecclesiastical usage. A sovereign church, like a sovereign state, might exercise clemency, instead of exacting the full measure of punishment which the law required. But long-continued and sometimes bitter controversies indicate the doubts which many Christians felt as to the propriety of this contention, which finally led to the catastrophe of the sixteenth century, when Luther voiced the protest of a large section of Christendom against certain current abuses of the doctrine. The first important step towards establishing the dispensing power of the Church was taken in consequence of the Decian persecution, beginning 250 A.D., when the problem arose how to deal with the lapsed. These questions were answered by the beginnings of penitential discipline. It was held that the Church, which had the power to inflict discipline, had also the power to remit it in whole or in part. The main exercise of this power in the fourth and fifth centuries was in shortening the canonical periods of penance, evidence of which is found, e.g., in the teaching of Gregory of Nyssa.

By degrees a variety of substitutes for the canonical penalties were introduced. Fasting might be remitted in consideration of repeating a certain number of psalms, or of paying a fine (as by Theodore of Tarsus, Archbishop of Canterbury, in the seventh century). Almsgiving, pilgrimages, and holy wars came to be the most popular means of securing indulgences, especially in the period of the Crusades. (See CRUSADE.) The Council of Clermont (1095) asserted that the pilgrimage to the Holy Land took the place of all other penance. With the decline of the Crusades indulgences were offered for fighting against heretics, such as the Albigenses and Hussites (q.v.). The first great jubilee indulgence was published by Pope Boniface VIII in 1300. The fully developed scholastic theory upon which indulgences are based is found in Thomas Aquinas and Alexander of Hales. The importance there attached to the "treasure of merit" naturally led to a popular belief among the ignorant that pardon for sin and immunity from punishment were matters of ecclesiastical bookkeeping—that they could be bought and sold. It was in view of this popular impression, and the undoubted abuses which grew out of it, that Luther published his theses on indulgences in 1517, the event which marks the beginning of the Protestant Reformation. See LUTHER.

The Council of Trent, at its twenty-fifth session (1563), condemned those who assert that indulgences are useless, or deny that the Church has power to grant them; but in reaffirming its belief the Church decreed the abolition of all evil gains and other abuses which had grown up in connection with the indulgence system. Since that time the Church has attempted to guard against misinterpretations of the doctrine and to safeguard it from the criticisms to which it had previously been exposed.

From what has been said it will be evident that Roman Catholics do not understand by an indulgence a remission of sin itself nor a purchased benefit to an impenitent sinner. They hold that its benefits can be enjoyed only by a sinner who has repented and resolved to lead a new life, and they deny the charge that the indulgence system has introduced any laxity of principle into the Church.

The power to grant indulgences for the whole Church resides only in the Pope, but primates, archbishops, and bishops have power to grant them within their own jurisdictions. The indulgence may be either plenary or partial—the former remitting the whole of the temporal punishment, the latter something less than the whole. For example, an indulgence of 40 days is understood to remit as much as would have required 40 days of penance without it. Indulgences may be attached to certain articles (e.g., a crucifix) or to certain places (as a shrine). In these cases the original possessor of the article or the pilgrim to the shrine receives the benefit of the indulgence. A custom of granting indulgences for the dead grew up in the Middle Ages. The right and efficacy of such grants have been much debated; but the Church holds them to be salutary, even though their precise scope cannot be defined. As limited by Sixtus IV (Constitution of 1477), they are "only by way of suffrage," i.e., the Church does not assume direct authority over the dead.

Consult: E. Amort, *De Origine, Progressu, Valore, ac Fructu Indulgentiarum* (Augsburg, 1735); Palmieri, *Tractatus de Pœnitentia* (2d ed., Prati, 1896); H. C. Lea, *History of Auricular Confession and Indulgences in the Latin Church*, vol. iii (Philadelphia, 1896); Moritz Baumgarten, *Henry Charles Lea's Historical Writings* (New York, 1909); A. M. Lepicier, *Indulgences: Their Origin, Nature, and Development* (ib., 1909).

INDULGENCE, DECLARATION OF. See DECLARATION OF INDULGENCE.

IN′DULIN. See COAL-TAR COLORS.

INDULT′ (Lat. *indultum*, indulgence, from *indulgere*, to indulge). A term derived from the Roman Imperial codes, and used in canon law to designate an exceptional concession or privilege granted by the Pope to one or more persons. The best-known examples apply to the privilege allowed in certain cases to kings and other rulers of nominating to bishoprics and ecclesiastical benefices; thus Francis I of France received this power when the Pragmatic Sanction was abolished in 1516. Indults were frequently granted in the Middle Ages allowing perpetual non-residence at the same time that the income was drawn; but this practice was abolished by the Council of Trent, except that canons who have a record of forty years' irreproachable service are dispensed by indult from further residence in the seat of their chapter. An indult differs from a dispensation in that the indult gives a permanent privilege, the dispensation applies to only a particular case.

INDUNO, ēn′dōō-nō, GIROLAMO (1827–91). An Italian genre painter, born in Milan. He studied at the Milan Academy under Sabatelli and first exhibited at the Paris Salon in 1855. His pictures are mainly of military or humorous subjects. Among them are "Garibaldi's Soldiers," "A Vivandière," "Dancing Lesson in the Last Century," "A Souvenir of Rome," "The Musicians," "Entry of King of Italy into Venice," "Visit of Garibaldi to Victor Emmanuel at Rome." Girolamo and his brother Domenico were leaders about 1860 in the Naturalistic movement of the Lombard school.

IN′DURITE. See EXPLOSIVES.

IN′DUS (Lat., from Gk. Ἰνδος, from Skt. *sindhu*, river). The great river that bounds India on the west, separating it from Afghanistan and Baluchistan (Map: India, A 3). It is over 1800 miles long, and the drainage area of its basin is estimated at 372,000 square miles. It rises in the vicinity of the Manasarawai Lakes, 50 miles southeast of Gartok, an important trading centre in Tibet, its source being 15,000 feet above sea level, on the north side of Kailas, a Himalayan peak, 22,000 feet high. Its general course, till it forces its way between the Himalaya proper and the Hindu Kush, is towards the northwest. It flows past Leh, the capital of Ladak; receives the waters of its important Trans-Himalayan tributary, the Shyok, from the north; and after a descent of 11,000 feet in a course of 500 miles, dividing the Mustagh from the Karakoram Mountains, through some of the grandest mountain scenery of the world, about 60 miles below Iskardo bends sharply southward, above the confluence of the Gilgit. It flows past Bunji, on the Kashmir-Kohistan border, and 20 miles below takes a western course to Kotgata, where again it turns southward, and at Darband emerges from the Kohistan Mountains into the plains of the Punjab. It becomes navigable for the native flat-bottom steamers at Attock (ancient Taxila), the scene of Alexander the Great's passage, 870 miles from its source. Here it receives the Kabul River (q.v.), its chief affluent on the right. Continuing past Dera Ismail Khan, Dera Ghazi Khan, and other minor towns, near Mithankot, about midway in its farther course of 940 miles to the Arabian Sea, it receives the waters of the Chenab, the Ghara, the Jhelum, the Ravi, the Beas, and the Sutlej, through the Panjnad (literally, 'five rivers,' which gives its name to the Punjab). Each of these rivers, as well as the Kabul, is practicable for inland craft to the mountains.

Below the confluence of the Panjnad the volume of the Indus, past Sakkar and Hyderabad, becomes gradually less. Through the arid, rainless, alluvial plain of Sind it divides into numerous channels, many of which do not return to the main stream, while others return much shrunken in volume. This wasting of the waters is not very apparent to the eye, owing to the gradual slackening of the current and the ascent of the tides. Miani, 8 miles north of Hyderabad and 75 miles from the sea, is the head of the delta which extends for 130 miles along the coast of the Arabian Sea. The chief outlets of the Indus are the Kori, Mal, and Yatho mouths. Until very recently the Puran carried the main waters to the Rann of Cutch, 70 miles east of the present mouth. The annual rise of the river, owing to the melting of the mountain snows, extends from May to August and is often attended by considerable inundations and changes of the deltaic channels, chiefly owing to the enormous amount of sand and clayey silt brought down by the current. Modern engineering has done much to obviate the inconveniences caused. The value of the Indus as a navigable route of traffic, never considerable, has been lessened since the building of railways through its valley from Karachi to Attock, and navigation is now confined to native craft. In a hot climate, where precipitation is almost nil, the river is more important as a means of irrigation, and the various works, especially the storage dam at Kasmur, towards this end inaugurated by the British government have led to a remarkable agricultural development throughout Sind. The river is spanned by several modern bridges, of which the chief is the huge cantilever bridge of Sakkar, and the northernmost an iron suspension bridge above Bunji. Fish of excellent quality abound in its waters and form the staple article of commerce and food of the surrounding country. The gavial, or long-snouted alligator, is the amphibious reptile of the river. The Indus is the "King River" of Vedic poetry.

INDUSIUM, ĭn-dū'shĭ-ŭm *or* -zhĭ-ŭm (Lat., tunic). In ferns, a flaplike outgrowth which covers the sorus or group of spore cases (sporangia). Indusia are exceedingly varied in structure and furnish characters for classification. Occasionally the sporangia are developed along the leafy margin which inrolls to cover them, as in the maidenhair fern and the common bracken. In this case the inrolled leaf margin is spoken of as a "false indusium." See FERN.

INDUSTRIAL ACCIDENTS. See ACCIDENTS, INDUSTRIAL.

INDUSTRIAL ARBITRATION. See LABOR AND CAPITAL, RELATIONS OF.

INDUSTRIAL COMMISSION. A nonpartisan commission, created by Act of Congress, June 18, 1898, to investigate industrial conditions and to suggest Federal and State legislation for the better regulation and adjustment of conflicting industrial interests. The commission consisted of 19 members, of whom 5 were Senators, appointed by the President of the Senate, 5 Representatives, appointed by the Speaker of the House, and 9 especially qualified persons, appointed by the President with the consent of the Senate. The specific duties of the commission were, first, to investigate questions of immigration, labor, agriculture, manufacturing, and business, and, second, to suggest, on the basis of the facts ascertained, proper congressional legislation and also uniform State legislation, equitable at once to employer and employee, producer and consumer. The life of the commission was limited to two years, but this time was subsequently extended to Dec. 15, 1901, and to Feb. 15, 1902, successively. The work of the commission, owing to the inevitable preoccupation of its congressional members in their own and in public affairs, was largely carried on by the presidential appointees and by specially engaged experts. Of the latter may be mentioned: on strikes and arbitration, E. Dana Durand; on labor legislation, Frederic J. Stimson; on trusts and industrial combinations, Jeremiah W. Jenks; on transportation, William Z. Ripley; on agriculture, John F. Crowell; on immigration, John R. Commons; on taxation, Max West; on labor organizations, Charles E. Edgerton. The fact that no equally competent body of men, empowered to call for witnesses and documentary papers, had ever before examined American industrial methods and organizations, together with the fact that the period of prosperity succeeding 1897 brought industrial phenomena into accentuated relief and activity, resulted in the commission's bringing together a great body of new correlated and substantiated evidence concerning practically every phase of industrial life. Testimony was taken from nearly 700 witnesses, including heads of trusts, railroads, and mercantile establishments, public officials and leaders of trade-unions, and in addition the commission collected much valuable but hitherto scattered information from official, national, and State documents, from judicial decisions, and from the researches of experts. The *Report of the Industrial Commission*, completed Feb. 19, 1902, and issued as a government publication, consists of 19 volumes, as follows: Trusts and Industrial Combinations (2 vols.); Trust and Corporation Laws; Prison Labor, Transportation (2 vols.); Labor Legislation; Distribution of Farm Products; Capital and Labor in Manufactures and General Business (2 vols.); Chicago Labor Disputes; Agriculture and Agricultural Labor; Agriculture and Taxation; Capital and Labor in the Mining Industries; Immigration and Education; Foreign Labor Legislation; Labor Organizations; Labor Disputes and Arbitration; Railway Labor; Industrial Combinations in Europe; Final Report —Miscellaneous. See Industrial Relations Commission.

INDUSTRIAL CRISIS. See Crisis, Economic.

INDUSTRIAL EDUCATION. That type of education which seeks to prepare for the industrial occupations, and hence may in the broad sense be used to refer to the whole range of education from manual training in the elementary schools to professional technical education of university and college grade. The term is, however, coming to be used in the more restricted sense to apply to that type of specialized vocational education which is given to boys and girls between the ages of 14 and 18 preparing to engage in industries. The subject is treated fully under Technical Education, with which it is more closely related as one of the lower branches of specialized technical preparation. See also Manual Training.

INDUSTRIAL EXHIBITIONS. See Exhibitions, Industrial.

INDUSTRIAL FRUITS. Such of the produce of the soil as is the result of cultivation during the year. The expression is of rare occurrence in English and American law (though it has been adopted into the law of Scotland), but it is not unusual in its Latin form. *Fructus industriales*, such as grain, vegetables, and the like, are distinguished from *fructus naturales* (natural fruits), such as the fruit of trees, growing timber and grass, which "grow from ancient roots" and are not the result of labor expended during the year. In legal effect the two classes of produce are sharply distinguished, industrial fruits being in many respects dealt with as personal property, or chattels, even before severance from the soil, while natural fruits under the same circumstances retain strictly the character of real property. Thus, industrial fruits may be attached or levied upon as the personal property of the occupier of the land, whether owner or tenant for life or years, while unsevered natural fruits remain a part of the freehold and are the property of the owner thereof, subject, of course, to the right of the tenant to gather them when ripe for his own use or for sale. For a special application of the distinction, see Emblements.

INDUSTRIALISM. A term first applied by Saint-Simon and his followers to the "modern régime," but also to the peculiar systems of social organization which they advocated. In his *Data of Ethics* Spencer uses the term as descriptive of "a theoretically possible form of society purely industrial in its activities." Pure "industrialism" according to Spencer would be reached when men were scrupulously honest in the fulfillment of agreements, while yielding "to one another no advantages beyond those agreed upon."

The meaning to be attached to the term has not yet been definitely established. By some it is employed to characterize the modern industrial system in which manufacturing industries predominate; others employ it as a description of modern civilization as opposed to the "militarism" of preceding times. (See Imperialism.) The definition which has been most generally accepted agrees in the main with Spencer's conception. This is exemplified by the deprecations of the "industrialism" of modern life, found in literature and religious writings.

INDUSTRIAL MANAGEMENT. A term used to describe the highly organized systems of conducting industrial and, particularly, manufacturing operations that have been developed in recent years. The movement towards systematic management took its rise in the last two decades of the nineteenth century, having been created by the growing complexity and increasingly large scale of manufacturing operations under the influence of which the old traditional methods of management began to prove inadequate. As usually understood, the term includes the activities of organization, administration, finance, purchasing, storage, and transportation of materials, provision and upkeep of buildings and machinery, design and manufacture of product, management and direction of men, determination and control of costs, and marketing of product.

The trend towards the new methods received its first considerable impetus from the introduction of F. A. Halsey's "premium system" (see Premium System) of rewarding labor in 1891. This was widely discussed and adopted both in the United States and also in England, where a modification known as the Rowan premium was put into use. Next in order came the publication of Slater Lewis's classical work, *The Commercial Organization of Factories*, in 1896, which, while emphasizing the necessity for accurate cost determination, also brought prominently into notice the fact that a modern manufactory is an organization in which all the constituents need equally careful attention. The studies of A. Hamilton Church on the expense burden, made public in 1901, further developed the idea that manufacturing was not a simple affair of labor and its direction alone, but that a stage had been arrived at where activity had become factorial or functionalized, and that each factor or function had its own separate cost and therefore its own separate efficiency.

During most of this time Frederick W. Taylor had been engaged in his experiments on high-speed steels, which afterward developed into the discovery that no less than 12 variables were concerned in the apparently simple work of cutting metals by lathe tools. From this discovery to the adoption of the idea that every step in the actual operative use of tools and machinery deserved study *before* expending time and money on the work itself was a natural deduction. Beginning as a method of rate fixing in connection with a special type of piece rate devised by Dr. Taylor, the idea developed until what is now known as time study (q.v.) and its further extension, motion study (q.v.), were ultimately worked out. Although unquestionably developed anew by Taylor, it is worthy of mention that the idea of carefully analyzing the ultimate elements of machine work is one that was developed quite early in the last century and afterward seems to have been lost sight of, probably owing to the vast rate of increase of manufacturing industry, which made intense production of more importance than extremely economical production.

In 1903 Dr. Taylor presented a paper entitled "Shop Management" before the American Society of Mechanical Engineers, in which for the first time the various devices and improvements in method which had been accumulating for many years were exhibited as part of one working whole. This was followed by the publication in 1910 of H. L. Gantt's *Work, Wages, and Profits*, in which papers made public at various times since 1904 were collected and completed. (See TASK; BONUS.) The work of Harrington Emerson on *Efficiency*, issued in 1909, and of Gilbreth on *Motion Study* also belong to the pioneer literature of the subject.

It is unnecessary to dwell further on the historical development of industrial management, especially as the apportionment of personal credit for this development would involve controversial questions. It will be more important to enumerate the leading features of modern systems of administration, with some attention to the way in which they differ from the older methods.

It is often supposed, though it is wholly erroneous, that there is some one system which is par excellence "scientific" management and is universally applicable to all sorts and conditions of manufacturing enterprise. On the contrary, the new elements which have been injected into the old traditionary methods are not so much revolutionary as evolutionary. Nearly all of them have existed in more or less complete and recognizable form in the past, but they have been extended, improved, and given greater precision. The general direction in which they have been developed is that of setting up a more complete and exhaustive knowledge (1) of the aim in view, (2) of the materials and forces by which this aim is to be attained, and (3) of the detailed means by which the forces are to be applied to the materials to produce the effect aimed at. It should be remembered that some of these forces are merely physical, but, on the other hand, many of them arise from the efforts and the coöperation of living beings and hence involve much more subtle elements than any problem that deals with inanimate matter has to cope with.

Before anything can be made, the necessary equipment and organization for its manufacture must already exist. With equipment, as such, management has nothing to do. It may be good or bad, but in discussing problems of administration it must always be assumed that the equipment is the best that can be obtained under the existing circumstances, otherwise no datum line for discussion can be drawn. With the organization, on the other hand, management has everything to do, for the organization is the instrument by which the behests of the management are set in motion and produce results. We may therefore begin by considering some of the more important features of modern factory organization, and for this purpose machine-shop or engineering manufacture may be selected as typical.

In regard to the aim in view modern management makes a much more detailed study than was formerly customary. In both cases the aim in view (e.g., a machine or device to be manufactured in quantity) has to be designed, and reduced to a drawing, before manufacture can be attempted. Then material has to be purchased, stored until wanted, delivered at some machine, and worked on. The resulting work has to be passed on as satisfactory, and it has then to be worked on again, or passed to an "assembler," who will fit it to the other parts of the machine or device in due course. It cannot be said that the old and new methods differ materially in sequence of these perfectly necessary steps, but under the newer practice the process marches from first to last with greater precision, and with the elimination of errors, delays, wastes, and irregularities that are plentiful where modern methods are not yet introduced.

The difference between the old and new methods begins at the very outset, viz., in the preparation of the design and even in regard to what is properly to be considered as part of a design. The newer practice gives a much greater extension to the idea of design than was formerly customary. The acts of design frequently include to-day, not merely specification of the physical shape and materials of each piece or component, but also detailed instructions as to how it is to be made, what operative machines are to be used in its manufacture, and what accessory tools are to be employed in dimensioning it. Nor is this all. Closely connected with the specification of the method of manufacture is the question of the amount of time that should be consumed at each successive stage by the machines and operatives to be employed in making it. Where this is doubtful, time study is undertaken for each successive element of the operations, so that the final specification in advance contains not only predetermination of size, shape, and material, but a close forecast of what steps must be taken to realize the design in practice.

It will be obvious that all the foregoing is a specification of intention. It is a plan of operations and nothing more. When it is completed, the work of the organic function of design reaches no farther. Moreover, this plan of operations is confined to the making of one piece and has no bearing on other pieces. Hence at this stage another organic function of manufacturing comes into play—the function of control, which is the great coördinative influence that gathers up the specifications of innumerable separate pieces and sets in motion the materials and forces by which all these separate specifications are to be carried out at the right time, in the right place, and on the right material. It will be readily understood that in the modern plant the function of control is not only very important but also complex.

The first step in control has reference to material. All plants keep a great deal of material in stock, and this may run to many thousands of different varieties. Elaborate accounting methods are necessary to insure that none of these items shall be permitted to fall below a minimum quantity, depending on the call for the particular item. But more than this is necessary. Material, when ordered, takes time to arrive. Consequently arrangements must be made to forecast as far as possible the demand on material, so that no waiting is involved. This is accomplished by means of the specifications above referred to. As soon as any one of these is issued, the material required for it is tabulated, and the quantity of each item assigned to the material ledger account corresponding. If this sets up a future demand greater than the visible supply in hand or on order, steps are taken to order more to arrive before the demand matures. By this means one of the most serious sources of delay and trouble, waiting for material, is reduced to a minimum.

The next important step in control has reference to instructions or orders. The design or specification already referred to is merely a plan. It does not of itself set anything in motion. In fact it may die still-born. The setting in motion of the forces of production must obviously be made in a certain sequence, having regard to the date at which delivery of product is required and to the expected deliveries of material. This is accomplished by the issue of orders, which are definite instructions to perform certain kinds and quantities of work on certain kinds and quantities of material on or before certain definite dates. Considerable coördination is obviously involved. The instructions, the material, and a machine and operative qualified to do the work and free at the moment to do it must all meet together, so that the piece may be processed and passed on to the next stage in regular order of sequence and also on time.

The assignment of orders for this purpose is frequently called "planning." In some industries it involves a somewhat complex organization. The element of time being involved, provision must be made to ascertain the "loading" of machines and operatives, i.e., the extent to which their capacity for turning out work is already committed, and the earliest day or hour at which they will be free for new work thus ascertained. This scrutiny must be carried out for every piece or component that is to be manufactured, since, if any one were neglected, it may happen that the assembly of parts into the finished product will be held up far beyond the promised date of delivery by the absence of some essential but comparatively insignificant piece.

Careful organization of the function of control, then, serves to set things in motion in a regular sequence and according to a predetermined time schedule. It secures that the material shall be at hand when required, it directs its movements from process to process, it keeps account of the capacity of the various production centres of the plant as regards their capacity already pledged, just as it keeps account of its stock of various materials and how far they are already pledged, and by means of these activities it keeps the stream of production flowing at a steady rate with an absence of annoying delays and untimely discoveries of matters which have been overlooked or forgotten that can be secured in no other way.

Alongside the function of control and to a large extent interwoven with it lies the function of comparison. It is not enough to specify in advance, nor is it enough to issue instructions and orders. It is also necessary to ascertain what has actually taken place and to compare the result with what was intended to take place. The function of comparison has two sides—one dealing with physical matters, commonly known as inspection, and one dealing with numbers and values, usually known as accounting. By means of inspection the intentions of design as regards shape, size, dimensions, and material are compared with the resulting piece. This frequently involves delicate measurements and is always a matter requiring great judgment and practical ability. The modern tendency to make the components of a product interchangeable has greatly developed the necessity for accurate inspection at every stage of the work. By means of accounting a wholly different class of results is compared with the original intentions, not only of design but also of control. The time taken to do work, the cost of material and labor, the actual movements of material as compared with their expected output, are all matters of accounting depending for their value on comparison with something previously planned.

In modern manufacturing the trend is towards setting up predetermined and fixed standards of effort, based on previous experience, on time and motion study and other careful observations, with which comparison may be made. Any falling short of these standards is termed "inefficiency," and a particular machine or class of work is then spoken of as 66 per cent or 75 per cent efficient, as the case may be. Unfortunately, in the present state of the art of management, the determination of reliable standards is exceedingly difficult, with the result that a good deal of charlatanry has masqueraded under the terms "efficiency" and "scientific management" with very harmful results. Generally speaking, however, it may be truthfully said that industrial management is passing from the qualitative to the quantitative stage. It begins to think in terms of quantity and number in every department, and although a great deal of its attention, possibly far too much, has been confined to the question of the quantity of labor in a given job—labor being the most obvious, though not always nor necessarily the most important factor in production—there are signs that the quantitative view is being applied to the other functions of management in increasing degree.

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INDUSTRIAL RELATIONS COMMISSION. A national commission created by virtue of an Act of Congress, Aug. 23, 1912, to inquire into the general condition of labor in the principal industries of the United States, including agriculture, and especially into those which are carried on in corporate forms; into existing relations between employers and employees; into the effect of industrial conditions on public welfare and the rights and powers of the community to deal therewith; into conditions of sanitation and safety for employees and the provisions for protecting the life, limb, and health of the workers; into the growth of associations of employers and wage earners and the effect of such associations upon the relations between employers and employees; into the extent and results of methods of collective bargaining; into any methods which have been tried in any State or in foreign countries for maintaining mutually satisfactory relations between employees and employers; into methods for avoiding or adjusting labor disputes through peaceful and conciliatory mediation and negotiations; into the scope, methods, and resources of existing bureaus of labor and into possible ways of increasing their usefulness; into the questions of smuggling or other illegal entry of Asiatics into the United States or its insular possessions and of the methods by which such Asiatics gain admission, the commission being required to make recommendations to prevent such smuggling and illegal entry. "The commission shall seek to discover the underlying causes of dissatisfaction in the industrial situation and report its conclusions thereon."

The commission consists of nine members, including at least three employers of labor, three representatives of labor organizations, and three representatives of the public at large, and is given extensive powers in the matter of holding public hearings and compelling testimony. President Taft, on Dec. 17, 1912, appointed nine persons as commissioners under the Act, but the appointments so made failed to give general satisfaction and failed of confirmation by the Senate. In the few months that remained of his administration President Taft made no further effort to put the law into effect, but left the matter to his successor. The commission was finally (June 26, 1913) constituted by President Wilson as follows: representing the public, Frank P. Walsh of Missouri (chairman), John R. Commons of Wisconsin, and Mrs. J. Borden Harriman of New York; representing employers, Frederick A. Delano of Illinois, Harris Weinstock of California, and S. Thurston Ballard of Kentucky; representing employees, Austin B. Garretson of Iowa, John B. Lennon of Illinois, and James O'Connell of Washington, D. C. These nominations were confirmed on September 10.

The commission has proved to be a very active body, holding public hearings in all parts of the country and conducting investigations covering a wide range of industrial relations. A partial report of its proceedings was submitted to the President in December, 1914. By the terms of its creation the life of the commission, unless renewed, will expire on Aug. 26, 1915.

INDUSTRIAL REVOLUTION. In the latter part of the eighteenth century and the early part of the nineteenth the economic life of England underwent a great transformation, which has aptly been called the Industrial Revolution. As late as 1760 the "open-field" system (q.v.) was the prevailing characteristic of British agriculture. Even in 1794, when the process of inclosing the commons and open fields had been progressing rapidly for a quarter of a century, out of 8500 parishes in England 4500 were still farmed in common. Great stretches of country lay quite unimproved; extensive bogs and heaths were found in all parts of the island. In many counties the miserable crops merely afforded sustenance to the agricultural population. The means of transportation were so defective that in one county surplus produce went to waste, while in an adjoining county scarcity prices prevailed. Industry was carried on by the domestic system, under which the manufacturer or merchant put out his materials to be worked up in the laborers' homes at piece wages. Exchange was still carried on largely by means of weekly markets, annual fairs, and through itinerant traders. British foreign trade was, however, increasing rapidly, and with the increased demand for goods prices of manufactures rose, affording the means of supporting a larger industrial population. The increased need for food rendered systematic agriculture more profitable, and the development of capital diverted much wealth to husbandry. A number of wealthy gentlemen turned their attention to the improvement of stock and the proper treatment of the soil (see AGRICULTURE) and demonstrated that agriculture could furnish returns rivaling those of trade, with the result that methods of agriculture were revolutionized. The continental wars enhanced the prices of agricultural produce and gave a great impetus to the adoption of the new methods. Between 1760 and 1843 nearly 7,000,000 acres of land were inclosed and put to intensive tillage.

At the same time the domestic system in industry was giving way to the factory system, as a result of the great mechanical inventions. In 1770 Hargreaves patented the spinning jenny; the water frame was invented by Arkwright in 1771; Crompton's mule was introduced in 1779. In 1769 Watt obtained his first patent for an improvement in the steam engine, and in 1785 it was successfully applied to the cotton manufacture. The effect of these inventions was enormously to increase output, the cotton manufacture trebling from 1788 to 1802. The iron industry, which had hitherto been relatively insignificant and was dwindling to still greater insignificance with the destruction of the woods, was revived by the employment of pit coal in smelting, rendered possible by the application of the steam engine to furnish power for the blast. The adoption in the woolen industry of the improvements in cotton manufacture extended the new system greatly. As a result of all these changes, English commerce, foreign and domestic, developed rapidly; shipping increased, good roads were built, and an era of canal building set in. Industry shifted from the rural towns to the large cities of the north of England, where labor was concentrated in factories, with the effect of improving the organization of labor and of making practicable numberless subsidiary labor-saving devices. Immense fortunes were made by those who were able to make use of the improved methods; population grew rapidly with the increased chances of employment. From 1791 to 1821 the population of England increased 43 per cent.

The period was, however, marked by a great deal of hardship to the working classes. The open-field farmers, displaced by inclosures, flocked to the cities and helped to reduce wages at times to a starvation level. The introduction of machinery deprived the hand workers of their means of livelihood; the crowding together of population in the large cities resulted in untold evils, moral and physical; the new life in the factory was not yet subjected to the regulations afterward found to be imperatively necessary. The employment in factories of women and children, with all its attendant evils, became common in all the manufacturing towns. The general effect of the revolution, however, was to give England a century's start over her rivals in the competitive race. The foundations for the prosperity of England to-day were laid by the thorough change in industry.

The rapid transformation from a low order of industrial organization to a higher order, that characterized the English Industrial Revolution, made its appearance at a later period in other modern states. In the United States this transformation did not begin until near the close of the first half of the nineteenth century; its full effects were not in evidence until the second decade after the Civil War. In Germany the changes corresponding with those of the British Industrial Revolution took place after the formation of the Empire. In Russia and Japan similar changes occurred towards the close of the nineteenth century. In the case of England the necessity of waiting upon the progress of invention prolonged the period of change. Other countries were able to introduce technical processes already tried out in England and hence became industrialized in a relatively brief time. In every country the process has been accompanied by a rapid congregation of population in cities, with resultant moral and political problems; exploitation of the labor of women and children, finally requiring legislative intervention; and the development of an organized labor movement. Consult: Held, *Zwei Bücher zur socialen Geschichte Englands* (Leipzig, 1881); Gibbins, *Industry in England* (New York, 1897); Warner, *Landmarks in English Industrial History* (London, 1899); Cheyney, *Introduction to the Industrial and Social History of England* (New York, 1901); Toynbee, *Industrial Revolution* (6th ed., London, 1902); Cunningham, *Industrial Revolution* (Cambridge, 1908). See FACTORIES AND THE FACTORY SYSTEM.

INDUSTRIAL SCHOOLS. This term, now passing out of general use, has been variously and loosely applied to a large class of schools, mainly of a philanthropic, reformatory, or experimental nature, in which industrial work has been taught to boys and girls at a comparatively early age. This kind of school has been represented perhaps more fully than elsewhere in England, where the Ragged School was a prominent type. The primary purpose of such schools is generally other than industrial, and the aim of the industrial instruction varies from the mere desire to keep boys off the streets to the serious effort to teach a trade. These institutions have not, however, filled the purpose of real trade schools, mainly on account of the early age of the pupils and the short period of instruction. Simple operations like broom and brush making, chair seating, or basketry, have been prominent in such schools; tailoring, shoemaking, and wood working less so. Industrial classes, which represent the same characteristics as the above, are often a feature of orphan asylums or homes for juvenile defectives. On the whole, this type of school has not demonstrated any important function in training for industrial work, and its place in the social order, as has been pointed out, is mainly pathological. In the early discussion on the introduction of manual training into the common schools the term "industrial education" was very often applied to this subject. See INDUSTRIAL EDUCATION; TECHNICAL EDUCATION; MANUAL TRAINING; GEORGE JUNIOR REPUBLIC.

INDUSTRIAL WORKERS OF THE WORLD. A revolutionary labor organization, popularly known as the I. W. W. The origin of the I. W. W. may be dated from a meeting in Chicago, 1904, of a group of radical labor leaders of whom the leading spirits were Thomas J. Haggerty, editor of the official organ, and Clarence Smith, general secretary treasurer, of the American Labor Union. A second meeting of some 30 labor leaders was held in January, 1905, which issued a call for an industrial union convention. At this convention, held in Chicago, June, 1905, were representatives from unions with aggregate membership of 40,000 men. The most important of these unions were the Western Federation of Miners and the American Labor Union. The convention adopted the name of the Industrial Workers of the World and a platform radically opposed in sentiment to those of the conservative trade-unions. Daniel de Leon and a number of his followers, representing the Socialist Labor party, were denied recognition at the convention, and formed a second organization at Detroit, known as the Detroit Industrial Workers of the World. The two organizations, although apparently in agreement on fundamental revolutionary principles, have been implacably hostile to each other. Hostility between both branches and the Socialists is even more intense.

The radical character of the principles of the I. W. W. is indicated by the preamble of their platform: "The working class and the employing class have nothing in common. . . . Between these two classes a struggle must go on until the workers of the world organize as a class, take possession of the earth and the machinery of production, and abolish the wage system." The antithesis to the principles of trade-unionism is indicated as follows: "Instead of the conservative motto, 'A fair day's wages for a fair day's work,' we must inscribe on our banner the revolutionary watchword, 'Abolition of the wage system.'"

According to the I. W. W. view, the employer has ceased to be an historical necessity and is merely a pernicious parasite. There can be no agreement with the employer morally binding upon the employee; arbitration and permanent settlements are impossible. It is the duty of the worker to injure the employer wherever possible. In accordance with this underlying philosophy the tactics of the I. W. W. is that of guerrilla warfare. Whenever it is possible to take the employer at a disadvantage, as, e.g., when the rush season is on, or contracts with penalties attached have been signed, the I. W. W. tactics demand a strike. When it appears that further injury to the employer is impracticable, the strike ceases, and the workers return, not with the intention of abiding loyally by the results of the conflict, but with that of injuring the employer still further while in his employ. Such methods of injuring the employer are known as sabotage. Sabotage may consist in throwing the progress of production out of order through tampering with machinery, improper use of materials, or even systematic loitering at work. Among the most improved methods of sabotage are obedience to the letter of the employer's instructions to the prejudice of the employer's intent; the use of materials better and more costly than the conditions of the market demand; exposure of the employer's trade secrets. I. W. W. speakers and writers have indicated, with some detail, how various industrial processes can be made to turn to the employer's loss without risk to the employee. Destruction of industrial plant, buildings, etc., is, however, not approved by the I. W. W., since it is the hope of the organization to take over from the present capitalist owners an efficient industrial equipment.

The I. W. W. has little faith in achieving "the emancipation of the working class" through politics. "Direct action"—i.e., the strike, sabotage, etc.—is held to be the only efficient means of expropriating the private owners of industrial property. In late years, however, there has been a growing feeling among members of the organization that it would be desirable to employ political means at least to the extent of insuring the "neutrality" of the police in conflicts between labor and capital.

The organization of the I. W. W. follows industrial lines. Its chief strength consists in industrial unions among textile, lumber, and marine-transport workers; but it has a scattering support in local industrial unions over a wide range of industry. Although on account of the activity of its leaders and the revolutionary nature of their doctrines, it has received much popular attention, its membership is small. According to Vincent St. John, general secretary treasurer of the I. W. W., the average paid up membership in the period March to August, 1913, was 14,310. With due allowance for members on strike and therefore exempt from the payment of dues, it would appear that the organization never has a bona-fide membership above 40,000, or 50,000 at most. Nevertheless it has been successful in conducting several spectacular strikes, of which the Lawrence strike of textile workers and the Akron strike of workers in the rubber industry are the most noteworthy. The effectiveness of the organization was due to its method of sending trained organizers to the scene of a dispute that had already broken out between employers and employees. In such conditions the I. W. W. is very successful in securing the enrollment of great numbers of the disaffected workmen, who however drop out, for the most part, after the dispute has been settled.

In both ideals and methods the I. W. W. bears a close analogy to syndicalism (q.v.). In its origin and development, however, it has been practically independent of syndicalist influence. Consult S. F. Brissenden, *The Launching of the Industrial Workers of the World* (Berkeley, Cal., 1913), and J. G. Brooks, *American Syndicalism: The I. W. W.* (New York, 1913).

INDY, ăN'dē', PAUL MARIE THÉODORE VINCENT D' (1851–). A French composer and pianist, born in Paris. It was his mother who gave him his first practical instruction, and at 14 years of age he was reckoned a master of the piano. From 1862 to 1865 he studied under Diémer, after which he studied theory under Lavignac and attended the lectures of Marmontel. In 1870 he enlisted in the army and at the conclusion of the Franco-Prussian War took up his studies under César Franck. In 1873 he became a member of the organ class at the Conservatory. Afterward he was engaged as second kettledrummer and choirmaster of the Société des Concerts du Châtelet. In 1885 he took over the management of the Société Nationale de Musique, and when César Franck became president of it, he acted as secretary, together with Chausson, and practically managed all its affairs. After Franck's death, in 1890, he became president. Besides his appointment of inspector of music in the city schools of Paris, he received the decoration of Chevalier of the Legion of Honor and was given charge of various important choral societies. Together with Ch. Bordes and A. Guilmant he founded in 1896 the Schola Cantorum, which soon ranked with the world's most famous music schools. (See CONSERVATORY.) In 1906 he made a very successful tour of the United States, when he conducted his own works with the Boston Symphony Orchestra. His creative genius finds its happiest expression in instrumental music, although two of his three operas, *Fervaal* (1897) and *L'Etranger* (1903), both on his own text, have met with more than average success. Berlioz, Franck, and D'Indy may be classed as the three preëminent instrumental masters of modern France. With Berlioz D'Indy shares a predilection for the classical forms, filling them with individual and very modern content; and a weakness in thematic invention skillfully disguised by a masterly, frequently dazzling technique. His music seldom makes an immediate appeal; it rather repels through bold and startling harmonies, to which one becomes only gradually accustomed. His principal works are: two symphonies, in G and B flat; the symphonic poems *Jean Hunyade, La forêt enchantée, Wallenstein* (a symphonic trilogy after Schiller), *Souvenir;* two orchestral suites, *Tableaux de voyage* and *Jours d'été à la montagne;* symphonic variations, *Istar;* a dramatic legend, *Le chant de la cloche;* a scene for baritone, chorus, and orchestra, *La chevauchée du Cid;* considerable chamber music; choruses; works for piano and for organ. As a writer, he published biographies of César Franck (1906) and Beethoven (1910), and in collaboration with A. Sérieyx a *Cours de composition musicale* in three volumes (1902–12). Consult: A. della Corte, *Profili di musicisti contemporani* (Rome, 1913); L. Borgex, *Vincent d'Indy; sa vie et son œuvre* (Paris, 1913); A. Sérieyx, *Vincent d'Indy* (ib., 1914).

INEBRIETY. See INTOXICATION.

IN'EQUAL'ITY (Lat. *inæqualitas,* from *inæqualis,* unequal, from *in-,* not + *æqualis,* equal, from *æquus,* even). The relation between two magnitudes which are not equal. If a 1–1 correspondence can be set up between the individuals of two groups, *a, b,* they are said to be equal. But if this correspondence extends to all of the individuals of *a* and to only a part of those of *b,* then $b>a$, and vice versa.

INER'RANCY. See INFALLIBILITY.

INERTIA, ĭn-ẽr'shĭ-ȧ (Lat., sluggishness, from *iners,* idle, from *in-,* not + *ars,* art). A general property of matter of which we become conscious through our muscle senses whenever by our muscles we change the motion of matter, e.g., throw or stop a ball, open a door, stop a revolving wheel, etc. It is noticed that the intensity of the sensation depends both on the material body itself and on the *rate* at which its motion is changed, i.e., the acceleration. It is believed that, if there were nothing external to the moving body affecting it, it would continue to maintain its motion unaltered forever. Galileo was the first to advance this idea; and it is now assumed as one of the principles of mechanics. It is sometimes referred to as the "principle of inertia." On the other hand, if there is some external action on the body, it takes time to produce a change in its motion, and the change produced in a given time will vary inversely as the quantity of matter, i.e., mass; or, to produce a given change in motion, the external action required varies directly as the quantity of matter, i.e., mass. It is to Newton that we owe our ideas of mass as a measurable fundamental property of matter. Up to his time weight was the only property of matter used as a measure of the "quantity of matter," although Galileo clearly understood the fact that matter had this property and made use of it in his discussions.

The article MECHANICS shows how numerical values may be given to the masses of bodies, and also that the proper measure of an external agency in producing acceleration is the product of the mass by the acceleration. Looked at in a different way, it may be said that "a material body offers opposition to having its motion changed," the numerical value of the opposition being the above product *ma*. This may be properly called the "force of inertia." See CENTRE OF INERTIA.

IN′ESCUTCH′EON (*in* + *escutcheon*, from OF. *escusson*, *escuçon*, Fr. *écusson*, escutcheon, from OF. *escut*, *escu*, Fr. *écu*, shield, from Lat. *scutum*, shield). In heraldry (q.v.), a single small shield charged on a larger one. When one's wife is an heir or coheir, the inescutcheon is used to display her arms. See ESCUTCHEON.

INES DE CASTRO, ē′nās dā kä′strō. See CASTRO, INEZ DE.

INEX′PIABLE WAR, THE. A war of extermination waged by Carthage against her unpaid mercenaries in 241–238 B.C. (See CARTHAGE; HAMILCAR, 7.) The scenes of this war are pictured in Flaubert's *Salammbô*.

INFAL′LIBIL′ITY (from ML. *infallibilis*, infallible, from *in-*, not + *fallibilis*, fallible, from *fallere*, to deceive, Gk. *σφάλλειν*, *sphallein*, to overthrow, AS. *feallan*, OHG. *fallan*, Ger. *fallen*, Eng. *fall*). The immunity from error, in definite dogmatic teaching regarding faith and morals, which is claimed by the Roman Catholic church and, at least as regards the past, by the Greek church, as represented in the decrees of the councils which the latter looks upon as ecumenical. The latter claim, however, which does not go beyond that of inerrancy, or actual exemption from error up to the present time, differs widely from that of infallibility as put forward by the Roman church, which involves not alone an actual historical immunity from error, but also such a positive and abiding assistance by the Spirit of God as will at all times both protect against the possibility of error and guide and direct in the faithful teaching of all necessary truth. The infallibility claimed by the Roman church is thus of two kinds, passive and active—the first (Matt. xvi. 18), in virtue of which the Church never can receive or embrace any erroneous doctrine, no matter by whom proposed; the second, in virtue of which she is charged with the function (Matt. xxviii. 19; Mark xvi. 15; Eph. iv. 11–16) of permanently teaching to the world the essential truths of God, of actively resisting every access of error, and of authoritatively deciding every controversy by which the oneness of belief among the faithful may be endangered. Catholics regard this gift as a necessary accompaniment of authority in the matters of faith. Catholic doctrine held from early times that the body of bishops throughout the Church, acting in common with the Pope, constitute the most perfect organ of the infallibility of the Church; and hence, that when they unite in any way, whether as assembled in a general council or separated in place, their judgment is infallible. Thus, if a doctrinal decree were addressed officially by the Pope to the whole Church and either expressly confirmed or tacitly accepted by the bishops, this decree was held to be infallible. In like manner, if a doctrinal decree, emanating even from a local council, as that of a national or even a provincial church, should be universally accepted by the Pope and the bishops, that decree also was held to be infallible. In a word, wherever there is found the united judgment of the Pope and the bishops, all agree in accepting it as the infallible judgment of the Church. Whether the Pope could judge without the bishops, was the great subject in dispute between the Gallican and Ultramontane divines—the latter affirming, the former denying, the papal judgment to be infallible, but all agreeing that it was not binding as an article of Catholic faith so long as it had not received the assent of the body of the bishops. The formal definition of papal infallibility as *de fide* dates from the Vatican Council of 1870. The minority of bishops who opposed the decree did so, as a rule, not because they disbelieved the doctrine, but because they considered its imposition as a necessary article of faith inexpedient. Those who refused to accept the dogma broke away and formed the Old Catholic church (q.v.). As formally declared, the definition is that the doctrinal decrees of the Pope teaching *ex cathedra*—i.e., when in discharge of the office of pastor and doctor of all Christians, by virtue of his supreme apostolic authority, he defines a doctrine regarding faith and morals to be held by the universal Church—are to be accepted as possessing the same infallibility which attaches to the teaching of the Church. See COUNCIL.

On the matter of subjects to which the gift of infallibility extends, Catholics are agreed in one principle, that it embraces all those subjects, and those only, which are necessary for the maintenance of divine truth in the Church. Hence, presupposing divine revelation, either written or oral, it embraces all questions of faith and morality, all subjects of general discipline, so far at least as to preclude the introduction, by authority of the Church, of any discipline which should be injurious to faith or to morality. On the other hand, it does not embrace questions of science, or matters of fact, or abstract opinions unconnected with religion. Thus, the popular misconception that the decision in the case of Galileo bears on the question of this strictly defined infallibility is seen to be baseless. It may be well also to point out that the Pope is not supposed to have the power to invent and enforce new doctrines, but can only declare and define those which have been held either implicitly or explicitly in the Church from the beginning. Consult: Hefele, *Honorius und das sechste allgemeine Konzil* (Tübingen, 1870); Rive, *Unfehlbarkeit des Papstes* (Paderborn, 1870); Salmon, *Infallibility of the Church* (London, 1888), a Protestant statement; Purcell, *Life of Cardinal Manning* (2 vols., ib., 1896); Foster, *Fundamental Ideas of the Roman Catholic Church* (Philadelphia, 1899); Wilfrid Ward, *Life of Newman* (2 vols., New York, 1912).

IN′FAMOUS CRIME (OF. *infameux*, from ML. *infamosus*, from Lat. *infamis*, infamous, from *in-*, not + *fama*, fame). An offense which is deemed to reveal such an absence of moral principle as to indicate that the culprit would totally disregard the obligation of an oath. Such crimes are punished according to their character, and the disabilities of infamy are imposed as an incident thereof. One of these disabilities was the incompetency of the convict to testify in a court of law, but this consequence has been removed by statute in England (6 and 7 Vict., c. 85) and everywhere in the United States. At the common law treason, felony, forgery, and offenses tending to pervert the administration of justice by falsehood and fraud, such as perjury, conspiracy, and cheating, were included in this classification. The Constitution of the United States provides that "no person shall be held to answer for a capital or otherwise infamous crime unless on presentment and indictment of a grand jury." The Federal courts have included all crimes punishable by imprisonment in a State prison or penitentiary in this category, and most of the State courts have adopted this classification. See Infamy. Consult the authorities referred to under Criminal Law.

IN'FAMY (from Lat. *infamia*, from *infamis*, infamous). The condition of legal disability imposed upon a person convicted of an infamous crime (q.v.). The term originated in the Roman law, under which system many derelictions of duty, such as a simple breach of certain contracts, as well as certain crimes, were punished with the civil and political disabilities of infamy. In the early English law the doctrine of attainder (q.v.) attached to the more serious crimes, and infamy only involved incompetency as a witness and incapacity to serve on a jury. The disabilities attaching to infamy are largely regulated by statute to-day, and in England and most of the United States all disqualifications on this account have been abolished.

IN'FANT. At common law, any male or female person under the age of 21 years. As the common law takes no account of a fraction of a day except when a question of property is involved, a person is held to become of age on the day before the twenty-first anniversary of his birth. It has always been the policy of the law to safeguard infants from the consequences of their own indiscretion by modification of many of the rules of law applicable to adults. Thus, an infant's contracts are voidable (not wholly void, like those of married women). That is, they are binding upon an adult contracting with an infant, but they may be avoided by the infant upon the ground of his infancy; but if the infant expressly or by implication ratifies the contract after he is of age, it cannot be afterward avoided by him. Whenever an infant disaffirms his contract he is entitled, upon principles of quasi contract (q.v.), to recover from the other party the reasonable value of the consideration or performance which he (the infant) has given under the contract, even though he has, before coming of age, squandered the consideration which he received. If, however, the infant have any money or property which he received under the contract, he must return it to the other party in order to be entitled to disaffirm the contract. While an infant is not bound by his contract, he is bound to pay for necessaries (q.v.) purchased by him, his liability being based on the theory of quasi contract. An infant may also pledge his parent's credit for necessaries upon the theory of implied agency if the parent does not supply them. See Agent.

In general, infants are liable for their torts. Where, however, the effect of holding the infant for his tort is indirectly to enforce his contract, the courts have denied his liability in tort. The practical application of this rule involves some very nice discriminations. Thus, an infant who hires a horse, and so negligently cares for him that the horse is injured, is not liable for tort or upon his contract; but if the infant appropriates the horse to his own use by going to some place other than that specified in the contract, he is deemed to have abandoned his contract and to be liable in tort.

An infant who is a property holder is subject to the laws of taxation, and his land is liable to be taken from him by eminent domain as if he were of age. At common law a legal marriage might be contracted between a boy of 14 and a girl of 12. See Age; Consent.

An infant of sufficient age and understanding to have criminal intent is responsible for any crime that he may commit. It is a rule of the common law, however, that this responsibility can never arise before the infant is seven years of age. After that period until he is 14 the law indulges the presumption that he acted without guilty intent. His capacity to understand the nature and consequence of his act must be proved by the prosecution in order to establish his guilt. After he has attained the age of 14 his position under an accusation of crime is that of an adult, with no presumption due to his infancy.

The parents of an infant are entitled to his custody during infancy, and they are also entitled to his earnings until this right is voluntarily renounced by them, when the infant is said to be emancipated. As between the father and the mother, the father was at common law absolutely entitled to the guardianship of the child, and he is still generally regarded as having the prior right, though the modern tendency of the courts is to accord the custody in case of dispute to the parent best able and qualified to care for the child.

In many States male infants of 18 years or over may be executors and administrators.

Infants are not permitted to sue in their own name and right either at law or in equity. The action must be brought by the infant's near friend (*prochain ami*) or guardian *ad litem* appointed for the purpose, who is a relative, a friend, or other proper person permitted by the court to prosecute the action in the infant's behalf. Courts of equity early constituted themselves the especial protectors of infants, giving them relief in various ways, particularly by appointing guardians over their person and property. The care of an infant's property by guardian is now generally regulated by statute (see Guardian), the effect of which is to place the infant's property in the possession of a guardian appointed by the court, who is required to invest and care for the property as a trustee for the infant. See Child, Growth and Development of; Contract; Domestic Relations; Parent and Child; and consult the authorities there referred to.

INFANT, Care of. See Child.

INFANT, Development of. See Child.

INFANT BAPTISM. See Baptism, Infant.

INFANTE, ėn-fän'tā (Sp., Portug., infant). The title given in Spain to the princes of the royal family, with the exception of the heir apparent, and to the consorts of the royal princesses. The corresponding title of Infanta is given to the princesses and to the consorts of the infantes. Since the fourteenth century the heir apparent to the throne in Spain has been styled Prince of Asturias. The title was formerly used in Portugal, also, the heir apparent bearing the title of Prince of Brazil.

INFANTE, JOSÉ MIGUEL (1778–1844). A South American statesman, born in Santiago de Chile. He played a prominent part in the revolution of 1810, was President of the Government Junta in Chile after 1814, and went on a diplomatic mission to the Argentine State in 1817. His patriotism was unselfish; he was opposed to arbitrary authority, and refused office when he thought his country in no need of his services. In 1821 he founded, and he edited till his death, the newspaper *El Valdiviano Federal,* in which he defended the federal idea. In 1843 he declined the position of Chief Justice of the Supreme Court, offered him as a mark of the nation's gratitude. He contributed greatly towards the emancipation of slaves in Chile and took active part in the establishment of the common-school system.

INFANT FEEDING. See INFANTS, FEEDING OF.

INFAN'TICIDE. The killing of an infant or newly born child; often, in a broader sense, the killing of an infant, whether entirely born, or in the act of being born, or of the matured fœtus in the womb.

As an institution or customary practice, infanticide has existed in most savage or semicivilized races and still survives in many; as an occasional or abnormal act, it has existed in all times and among all peoples.

Some authorities, as McLennan, have claimed that the custom has been practically universal among primitive races; but the researches of other investigators, as Spencer and Westermarck, have shown it to have been much less widespread than this. Infanticide as practiced among early peoples is to be traced ultimately to conditions of hardship attached to the bringing up of children. Thus, among the Abipones, where the women often practice infanticide, the boy was generally sacrificed; for when a son grew up it was necessary to buy a wife for him, while a grown-up daughter could always demand her price. But this hardship more usually attaches to the bringing up of female children, and it is therefore the females who are usually killed rather than the males. This is said to be especially true of those tribes who maintain a precarious existence among enemies, and who are forced by their manner of living to lead a migratory life. The practice of killing female children among these people often left the primitive hordes with very few marriageable women, so that they were forced to prey upon each other for their wives. This by some has been considered to account for the rise and growth of exogamy; while others have (with less reason) attributed infanticide to the custom of exogamy. In Africa, where the warm climate and the abundance of tropical fruits make the conditions of existence easy, there are no well-authenticated cases of the custom of destroying new-born children.

The natives of two-thirds of the South Sea islands practice infanticide probably more extensively than any other peoples known to history. The chief reason is probably the fact that the islands are of very limited extent and are as thickly populated as they could be and support life by the natural products of the soil. In parts of Australia it is said that the *mother* destroyed all but two boys and one girl, while in Samoa and other Pacific islands and in some parts of Australia the custom is unknown. Generally speaking, therefore, infanticide is most commonly practiced among races living where the struggle for subsistence is most severe, or where custom imposes the most serious burdens upon those rearing children. The best-known instances of infanticide are those which existed in various forms through India, but which are now mostly suppressed in the territory under the control of the British government by a system of compulsory reporting of births and deaths and of police supervision in districts suspected of the practice. It was practiced among certain of the tribes of lower caste as well as among the Rajputs, although forbidden both by the Koran and the Vedas. Among some tribes it was due to hardship attaching to the procuring of the means of subsistence, and among others its origin, or the persistence of it, was due to artificial hardships attendant upon child rearing, as among the Rajputs, with whom it was dishonorable for a girl to remain unmarried, and the necessary expenses of her marriage were a ruinous burden upon the parents. A similar condition obtains among certain of the American Indians of the Northwest.

When infanticide has become established as a custom among a savage race, its practice, like all practices connected with birth or marriage, frequently assumes a sacrificial or religious import, and it is by some considered to be the explanation of the origin of the practice of sacrificing children to the gods. So, also, the method of killing becomes in many cases a matter of custom, as by casting into the Ganges in some parts of India (whence the reverence paid to the alligator, which fed upon the children), or poisoning with opium or datura smeared upon the mother's breast, or by sacrifice to some god. Where the practice survives as a sacrifice, it is usually the boy child that is killed. Any change in social conditions or habits which makes child rearing less of a burden tends to decrease or do away with infanticide. It may however, still be permitted or survive as a means of disposing of the weak or defective, as was the case in ancient Greece, where the killing of weak children was enjoined in the ideal systems of Aristotle and Plato and by the actual laws of Lycurgus and Solon.

Infanticide, as it exists among peoples whose laws or customs forbid its practice, is due to special abnormal causes, as extreme destitution, insanity, abnormal antipathy to the child, fear of disgrace, etc. The usual cause among modern civilized nations is the desire on the part of an unmarried mother to escape the shame of illicit childbearing or to escape the burden of caring for an illegitimate child. (See ILLEGITIMACY.) In some cases, as in France, laws have been passed which aid the mother in supporting her illegitimate child without exposure or undue burden; and these laws are said to have reduced the proportionate number of infanticides, but to have increased the number of cases of illegitimacy.

The laws of all modern civilized nations treat infanticide as a crime, but they vary too greatly to admit of being specifically stated here. Some of them treat it as a special crime of less gravity than murder, restricting infanticide to the killing of an infant which is newly born (within the time limited by the law); and others make no distinction between infanticide and murder, the question as to when the infant was born being immaterial. The latter is the case at the common law of England and the United States, where the unlawful killing of a fully born child is murder, as distinguished from the killing of an unborn child, which is abortion. See ABORTION; BIRTH.

Consult, for the full discussion of the law as to infanticide and much of the general history, the works referred to under MEDICAL JURISPRUDENCE, such as Taylor, *Principles and Practice of Medical Jurisprudence* (3d ed., Philadelphia, 1883); Wharton and Stillé, *Medical Jurisprudence* (4th Amer. ed., ib., 1884); *Manual of Medical Jurisprudence* (12th Amer. ed., ib., 1897). For the other aspects of infanticide, consult: Sir John Lubbock, *Origin of Civilization, and the Primitive Condition of Man* (3d ed., London, 1874); id., *Prehistoric Time* (7th ed., ib., 1913); McLennan, *Studies in Ancient History* (ib., 1876); Lecky, *A History of European Morals* (3d ed., ib., 1877); Westermarck, *The History of Marriage* (New York, 1891); and, for the history of the subject in India, consult Browne, *Infanticide: Its Origin, Progress, and Suppression* (London, 1857).

INFANTILE SORE MOUTH. See THRUSH.

INFANTILE SPINAL PARALYSIS. Acute anterior poliomyelitis. An acute febrile disease of children and young adults, due to a special but unknown microörganism. Flexner and Noguchi discovered in 1913 a minute organism which they believe to be the cause of the disease. The malady is characterized by inflammation of the gray matter of the spinal cord and medulla and results in paralysis of certain muscles or groups of muscles. The disease was first recognized by Heine in 1840. Vogt and Duchenne described the malady in adults in 1858 and 1864 respectively, but the large majority of cases occur during the first five years of life. Animal experimentation has established the fact that the specific bacteria finds lodgment and multiplies in the mucous membrane of the nasopharynx, and it is probable that the disease is disseminated by means of the secretions of the nose and throat. Efforts have been made to show that the virus is carried by the stable fly, but the evidence is not conclusive. The virus is easily killed outside of the body, but may persist for a long time in the mucous membrane even of healthy individuals, who may be the innocent cause of spreading the infection. A child attacked with acute poliomyelitis is noticed to be out of sorts, restless, without appetite, and may have a temperature of 100° to 103° F. The attack may come on with vomiting or convulsions. In the course of a day or two the legs or arms, or both, become paralyzed and tender to the touch. Complete recovery may take place, but usually one leg or an important group of muscles remain paralyzed and wasted. This results in lameness and various deformities, which have to be corrected by orthopædic appliances or operation. Treatment during the stage of recovery must be hygienic, massage and electricity helping materially in the cure. See POLIOMYELITIS.

INFANT MORTALITY. The mortality of infants is of interest not alone to the family but to the social worker and the statistician. About one-fifth of the total deaths are of infants under one year of age, and nearly one-quarter of all deaths are of two years or under; hence they constitute an important factor in mortality records.

The percentage ratios vary, depending upon whether they are based on census returns or upon records of living births. In France in the decade ending 1905 the infant rate per 1000 born alive was 149, while the rate per 1000 enumerated in the census was 172. The same differences in ratio prevail in all countries. It might be stated here that Ireland had the lowest rates, viz., 102 and 123, and that Bavaria had the highest, 249 and 321, on the same basis during the same years. There is a sex difference, the deaths of males ranging from 16 to 30 per cent higher than females. The younger the infant, the higher the mortality; one-third of the first-year deaths occur during the first month and one-half of them within three months.

There are many factors in infant mortality—prenatal causes, illegitimacy, heredity, race, climate, manner of feeding, manner of living (urban or suburban), overcrowding, season of the year, also specific diseases (general or infectious). It is claimed that from 20 to 25 per cent of pregnancies fail to mature, and it is certainly true that the birth rate is steadily falling in nearly all countries.

BIRTH RATE PER 1000 POPULATION

COUNTRIES	Years	Rate	Years	Rate
England and Wales..	1851–60	34.1	1901–05	28.1
France............	1851–60	26.3	1901–05	21.3
Germany...........	1851–60	35.3	1901–05	34.8
Italy..............	1871–80	36.9	1901–05	32.4
United States.......	1851–60	33.6	1901–05	* 24.0

* Average of Connecticut, Maine, and Massachusetts (Webb, 1911).

Illegitimacy is an important factor. While all children may be born with equal health, the illegitimate infant is frequently neglected or sent to an institution and fed artificially. Their death rate is double that of legitimate births; e.g., Norway's rate of 89 legitimate *versus* 177 illegitimate per 1000, Italy 163 *versus* 239, France 149 *versus* 255. It is interesting to note that illegitimacy is declining. In England the rate is now 3 per cent instead of 6.5 per cent, as in 1860.

Heredity. The offspring of tuberculous or alcoholic parents are lacking in vigor and are more susceptible to disease. The alcoholic tend to be mentally defective.

Race. In New York City and Chicago the rate for colored infants is the same as for white, but in many of the Southern cities having a large number of colored people, many of them very poor, the colored rate is double that of the white, e.g., Washington with a rate of 105 for white and 244 for colored infants per 1000. There is reason to believe that this difference is due more to economic conditions than to race characteristics.

Climate and Season. The difference between a cool and a warm country is illustrated by the infant rate of Stockholm in 1910, 92; while Rio de Janeiro for the same year had a rate of 166 per 1000. In temperate climates it is well understood that the hot months are the hardest for the infants. Heat diminishes the activity of the digestive glands and lessens the desire for food. It causes increased watery evaporation from the skin and in general lowers the vitality. In July and August we also have an increase in humidity and an increase in the likelihood of food decomposition. In Manchester it was noted that the death curve of diarrhœa in infants corresponded closely to the prevalence of flies. This gives a hint in favor of cleanliness. Another study showed that the death rate rose as the wages fell, which means more crowding of persons in small rooms. The same study showed that poor ventilation led to overheating and consequent high death rate. The death rate for all ages rises with increased density of population, but the rise is four times greater for infants than for other ages. The rural rate for diseases of early infancy in the United States registration area is about half that of cities; e.g., in 1907 the city rate was 82.2 and the rural rate 49.4.

Manner of Feeding. A study of 844 breast-fed infants in Westminster (London) in 1907–08 showed 84.8 per cent of them healthy, and that only 2.3 per cent died within one year. Of 140 bottle-fed babies 47.1 per cent were healthy and 12.1 per cent died in one year. Institution babies generally have a higher death rate than those outside. For example, New York City maintained an infant's hospital for 33 years. There the average rate for children with mothers was 10.8 per cent; bottle-fed (foundlings), 53; farmed-out, 35.3; wet-nursed, 17.7.

Special Diseases. Diarrhœa and enteritis head the list. According to the United States mortality statistics from 80 to 85 per cent of these occur under two years and chiefly during the months of July and August. Next come bronchitis and pneumonia, 48 per cent of the latter occurring under two years in 1910. Death rates have been falling steadily in recent years in all civilized countries, and it is a pleasure to note that it is especially true of infants. In New York City, e.g., the rate of 1880 was 288 per 1000 living infants, while in 1914 it was only 94.6 per 1000. There are many factors leading to these results. Modern boards of health have departments of infant or child hygiene. Day nurseries (see NURSERY, *Day Nursery*) are common—New York having 94 in 1914, Chicago and Philadelphia more than 30 each, other cities in proportion. Since 1911 New York has also had 79 milk stations for dispensing pasteurized milk free or at small cost, and a special force of 190 physicians and nurses to visit the tenement children during hot weather. There are numerous private charities in most of the large towns in this and other countries, all for the babies' welfare.

The American Association for Study and Prevention of Infant Mortality was organized in 1909 and maintains an executive secretary in Baltimore, Md. Consult: G. B. Phelps, *Statistical Study of Infant Mortality* (Boston, 1908); G. B. Mangold, *Child Problems* (New York, 1910); American Association for Study and Prevention of Infant Mortality, *Reports of Annual Meetings* (Baltimore, 1910–11); Registrar-General of Great Britain, *Annual Report, 1911; Mortality Statistics, 1913*, United States Bureau of the Census. See VITAL STATISTICS.

INFANTRY (Fr. *infanterie*, from Sp. *infanteria*, from *infante*, child, boy, servant, foot soldier, from Lat. *infans*, infant; foot soldiers being formerly the servants and followers of knights). Soldiery serving on foot, as distinguished from cavalry; that part of a military establishment using small arms and equipped for marching and fighting on foot, constituting the oldest of the arms into which armies are conventionally divided, as a company, regiment, or brigade of infantry. The infantry forms the great bulk of any army; it is they whose means of transportation are their own feet, who carry their own weapons, ammunition, shelter, and food, and who on the march and in combat bear the heaviest burdens and losses. Beginning with the higher units, the infantry is organized into *brigades*, of three regiments each. The brigade is commanded by a brigadier general. The *regiment*, commanded by a colonel, is made up of three battalions. Each *battalion*, under command of a major, consists of four companies. The *company* is the command of a captain, who is assisted by two lieutenants; it is the smallest administrative unit, but for purposes of training and combat is divided into *platoons* and *squads* under the lieutenants, sergeants, and corporals.

Infantry is adapted for combat with firearms as well as with the bayonet, for attack as for defense, for action in close as in extended order. It can fight on any terrain which is at all passable and is more independent of weather and seasons than the other arms; it surpasses the other arms in endurance—a man, on account of his will power, bearing privations and exertions better than a horse.

According to Herodotus, when Greek met Persian at Plata, in courage and in strength the Persians were not inferior, but they were without armor, and moreover they were unversed in war and unequal to their opponents in skill. The Greek armies consisted almost entirely of infantry. The leaders fought either on foot, like the rest, or from chariots. The men were gallant, high-spirited, and intelligent, and well fitted to become distinguished soldiers. The Medes and Persians were highlanders, the bow was their native weapon, and as children they were taught to ride, to shoot, and to speak the truth; but Cyrus taught them to hold the foot soldier in little esteem, and it has always been true from very early times that infantry never reached a high standard where foot service was despised.

The Greek infantry played such an important part in all of the early wars that it is worth while to notice it rather carefully. It was divided into three classes. First were the heavy troops, called *hoplites*, or *hoplitai*, armed with spear, dagger, corselet, and a large oval shield. These formed the phalanx or main line of battle and were composed entirely of free citizens. Secondly, the light troops, armed with javelins, but carrying little defensive armor and no shields. These were destined for skirmishing and covering the movements of the phalanx. Thirdly, there were irregular light troops, carrying no defensive armor, but provided with javelins, bows and arrows, and slings and other things with which to harass the enemy. The best men were placed in the front rank, and for marching and manœuvring each man was allowed 6 feet both in breadth and depth, but ranks and files closed up for the fight and even locked shields. A battle was regarded as a duel, and the tactics were very simple—a direct advance and engagement along the whole line. All faith was placed in shock tactics, but there was always a tendency to drift to the right, each man seeking protection for his unshielded side, and this habitually led to the outflanking of the left of each army by the other. Fighting over rough ground or breaking through obstacles was avoided, if possible, as disorder always resulted.

The phalanx was the basis of all Greek tactics; the number of men in each phalanx, and the number of phalanxes into which the battle formation was divided, varied according to circumstances, but from 2000 to 4000 men was about the usual strength of a phalanx. The weight of impact, both in the triangular and rectangular formations, was the great advantage of the phalanx, but this had to be sacrificed to a certain extent in order to obtain a more flexible machine.

It was likewise a Theban custom to fight in deep formations; at Delium (424 B.C.) their phalanx was formed in 25 ranks. Epaminondas modified their phalanx, forming it on a narrower front with greater depth and the soldiers standing so close together that they could not turn around. This formation gave more weight at the point of impact. The Theban column which crushed the Lacedæmonian phalanx at Leuctra (371 B.C.) and Mantineia (362 B.C.) was 50 ranks deep as compared with a depth of 8 in the phalanx of their enemies. In these battles, too, Epaminondas introduced for the first time the distinction of an *offensive* and *defensive* wing, which completely surprised his enemy and gave the Thebans a primacy which lasted until his death.

It is interesting to note that Philip of Macedon spent some years in Thebes while Epaminondas lived, and afterward turned to good account the lessons of his victories and the improvements in the military art which half a century of war had developed in Greece. The famous Macedonian phalanx which he created had a normal depth of 16 ranks, and the units were the file of 16 men, the section of 4 files, and the battalion of 64 files. The Macedonian hoplite wore a leather jacket with metal plates, light greaves, and a round hat. He had a short sword and a small shield; his spear was about 21 feet long, of which 13 feet were to the front and 8 feet to the rear of the hoplite when the spear was leveled. Hence five rows of spear points would show beyond the front of the phalanx. The 11 hinder ranks held their spears upward over the shoulders of the men in front of them to intercept missiles.

Upon Philip's death he left a standing army to his son Alexander, whose military genius enabled him to establish the largest empire the world had yet known. The infantry in the army which accomplished this result was divided into heavy and light armed, and the actual force with which Alexander crossed the frontier was 30,000 infantry and only 4500 cavalry. The Macedonian grand phalanx, as evolved by Alexander, numbered 16,384 heavy-armed infantry, and at Arbela (331 B.C.) his army consisted of two such phalanxes. In the wars of Alexander's successors armies were very similar in numbers and quality, and mobility lost some of its importance. The increasing use of elephants marked a decline in the use of infantry, as they made any advance and engagement of the foot troops difficult. The Macedonian phalanx was the crowning point of Greek military organization, but it lacked mobility, and as a result it went down before its Roman foe, which to a greater extent possessed that most valuable military asset.

The wonderful supremacy which Rome so long maintained had its foundation in the Roman legion, which was raised in the following manner: a township consisted of 10 wards (*curiæ*), each comprising 10 families (*gentes*) or 100 households. Each household furnished one foot soldier (*miles*), and each family one horseman (*eques*). However, in the earliest days the three tribes of Rome furnished three times that strength or 3000 foot and 300 horse. The legions were later greatly increased. The first three classes of Roman citizens furnished the heavy infantry, but only the first class was bound to be fully equipped with arms and armor. This class furnished the front ranks of the legions, which were drawn up in battle six deep in continuous line.

Owing to the disaster which befell them at the Caudine Forks (321 B.C.), however, the Romans made a fundamental change in their formation. Continuous lines were given up, and the legion was subdivided into thirty *maniples*, which were placed checkerwise in three lines called *hastati*, *principes*, and *triarii*, so that the maniples of the second line were opposite intervals in the first. This afforded a flexible formation which adapted itself readily to broken ground and at the same time afforded strong reserves. The maniples of the first two lines were normally 120 strong, those of the third line 60. The triarii were the oldest soldiers and generally formed the third rank. The principes were the best men; they were heavily armed and formed the two front ranks. The hastati were lightly armed with a spear or pilum; they were the youngest men and later came to be used in the front rank. The legionary infantry was armed with shields, body armor, and a short heavy spear or pilum; but the primary weapon of the Roman soldier was a straight two-edged sword which was used for thrusting rather than for cutting.

At Cynoscephalæ (177 B.C.) and at the battle of Pydna (168 B.C.) the legion proved the value of its tactical flexibility over the solid mass formation of the phalanx.

The Roman armies owed their extraordinary ascendancy to three principal causes—discipline, promptness in adopting military improvements, and, above all, to the care in selection, training, and exercise of the individual soldier. But under a succession of weak and profligate emperors all discipline was lost; the legions degenerated into a worthless militia and fell an easy prey to the daring tribes of the North.

During the Middle Ages the races which occupied north Germany and Scandinavia attracted considerable attention on account of their splendid infantry. So it was, too, with the Franks, whose infantry were so well practiced in war that they were able to turn back the tide of Saracen invasion at Poitiers (732 A.D.). This sturdy infantry, however, soon disappeared, and it was nearly 1000 years before French infantry recovered its reputation. It declined with the growth of feudalism, and foot soldiers became mere attendants for the mounted men at arms.

The army with which William invaded England not only included bowmen, but some mail-clad infantry armed with spears and swords. It was by the coöperation of archers and cavalry that the battle of Hastings was won, and from that time archers formed an important part of English armies, and archery was encouraged as a national sport.

The Crusader armies were largely composed of foot troops. The victories of Cœur de Lion were due to skillful coöperation of heavy cavalry and crossbowmen. But for infantry to recover its old position it was necessary to combine excellence in the use of missiles with excellence in hand-to-hand fighting, and it was the association of the English archer with the dismounted man at arms that gave the feudal military system its first real shock.

At the battle of Crécy (1346) the English army consisted of 20,000 men all told, but there were 10,000 archers, and although the French army was three times as large as the English, it was almost annihilated by the English longbowmen. The long bow with which this result was accomplished was about 6 feet long, and two shots a minute could be delivered from it with great accuracy to a range of 220 yards.

The French were taught at Crécy that they must be prepared to fight on foot, and while this instruction was being given to France, the Swiss were administering to the knights at Morgarten (1315) and at Laupen (1339) even stronger lessons, showing what determined infantry could do against mounted or dismounted foes; and when the Swiss infantry in the three battles of Granson, Morat, and Nancy defeated the Burgundian chivalry, the feudal military system was dealt a deathblow, and the great prestige which had been attached to mailed horsemen was forever destroyed. The idea that the wearing of armor and the use of weapons were reserved by God and nature for persons of quality was dismissed, and infantry regained the universal esteem in which it had been held in ancient armies, and that esteem has never again been lost.

Early in the sixteenth century the use of firearms became general, but many years passed before the pike was entirely supplanted. At the battle of Ravenna (1512) artillery played its first decisive part on a battlefield. The increased use of firearms, and especially of artillery, was a hard blow to the Swiss infantry shock tactics, as it has become to all troops in battle. The Swiss infantry, through neglect of proper training, rapidly declined, and at Pavia, owing to their behavior and the effectiveness of the Spanish infantry fire, Francis I was defeated and became the prisoner of Charles V.

The Swiss pikemen have been aptly compared to the Macedonian phalanx, and the Spanish sword-and-bucklermen to the Roman legionaries, and it is interesting to observe that in each case the infantry armed with weapons better suited for hand-to-hand fighting triumphed. The Spaniards made more use of defensive armor than the Swiss did, which gave the former a great advantage in close fighting.

Gonsalvo de Córdoba, Ferdinand's "Great Captain," was the creator of the magnificent Spanish infantry, which was originally modeled on the Swiss; it soon eclipsed the latter and became in turn the model for other nations. More heavily armed than the Swiss, it trusted, like them, to massive formations and the irresistible weight of its attack. During the sixteenth century it maintained its reputation, and it was not until the close of the century that its renown began to fade. Its success was largely due to the fact that its recruits were natives of the rugged provinces of the North, hardy, temperate, patient, and quick to learn the use of firearms; men of the highest rank were proud to command a company of infantry and often preferred it to a cavalry command.

EARLY ORGANIZATION

The regiment was created as an administrative unit, and battalions (*battaglia*, battle array) became the recognized tactical unit for infantry. The earliest infantry organization was the company and originally represented a group of men who followed a knight to battle. Maurice of Nassau, whose introduction of the intrenching tool necessitated tactical changes, favored small battalions (400 men), formed in three lines, thus creating a mobile force and at the same time units which could best assist and relieve one another. The three divisions of the infantry thus formed (van, battle, and rear) are, and in various crude forms have been always, recognized as the correct principle for infantry combat. The steady improvements in firearms necessitated more frequent changes in tactics; the dependence upon shock action came to be recognized as a dangerous thing.

Infantry played the chief part in the Dutch war of independence, and its fire action was greatly developed. The lance was practically laid aside, and shock tactics were superseded by fire tactics.

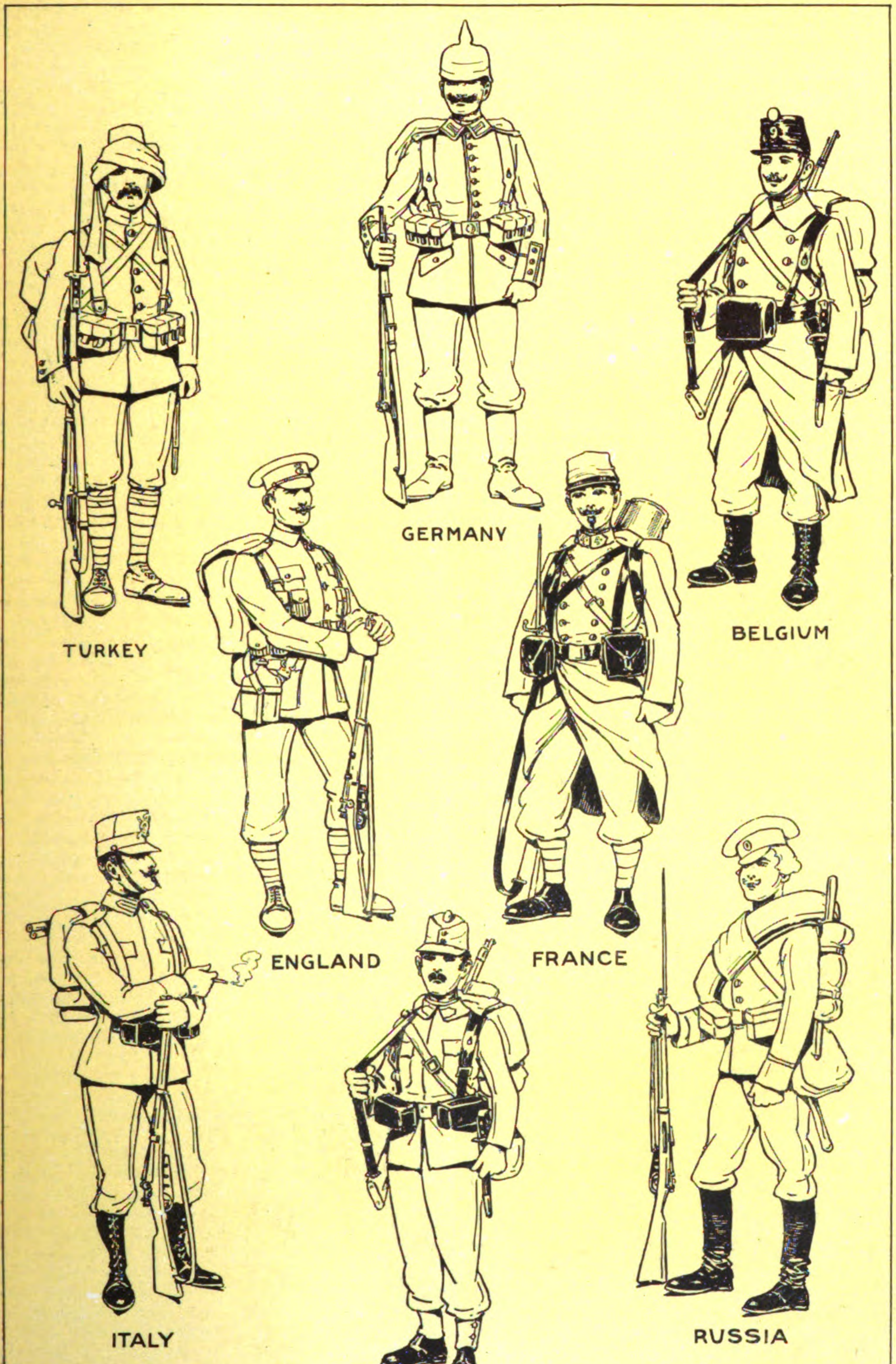
Gustavus Adolphus adopted a new tactical formation for his infantry, which was a modification of the Dutch order. His battalions consisted of four companies of 54 pikemen and 72 musketeers; he adopted a formation of 6 ranks instead of 10. The battalions were grouped by threes into brigades, the middle one being pushed forward beyond the alignment of the other two. The brigades were drawn up in two lines; this combination of line and column was valuable both in attack and defense. Gustavus equipped his troops with the most modern and effective firearms. At Lützen (1632) the Swedish infantry was put to the test, and it proved its worth and set a new standard for armies.

During the seventeenth century the firelock gradually succeeded the matchlock as an infantry weapon. A "charge" of infantry came to mean a fire fight at close quarters until one side gave way rather than a collision; still less use was found for pikemen, as there was little scope for them in attack and defense of intrenched positions and they were of little value in broken country. The bayonet was devised in order that infantry might fight cavalry without the aid of pikes. During the sieges of the Thirty Years' War infantry made considerable use of hand grenades.

Towards the end of the seventeenth century there were four kinds of infantry—pikemen, musketeers, fusiliers, and grenadiers; but during the War of the Spanish Succession these were practically reduced to one kind, all armed with firelock and socket bayonet. This simplified formations and tactics; ranks were reduced to four and sometimes to three. With three ranks the front rank knelt and often reserved its fire.

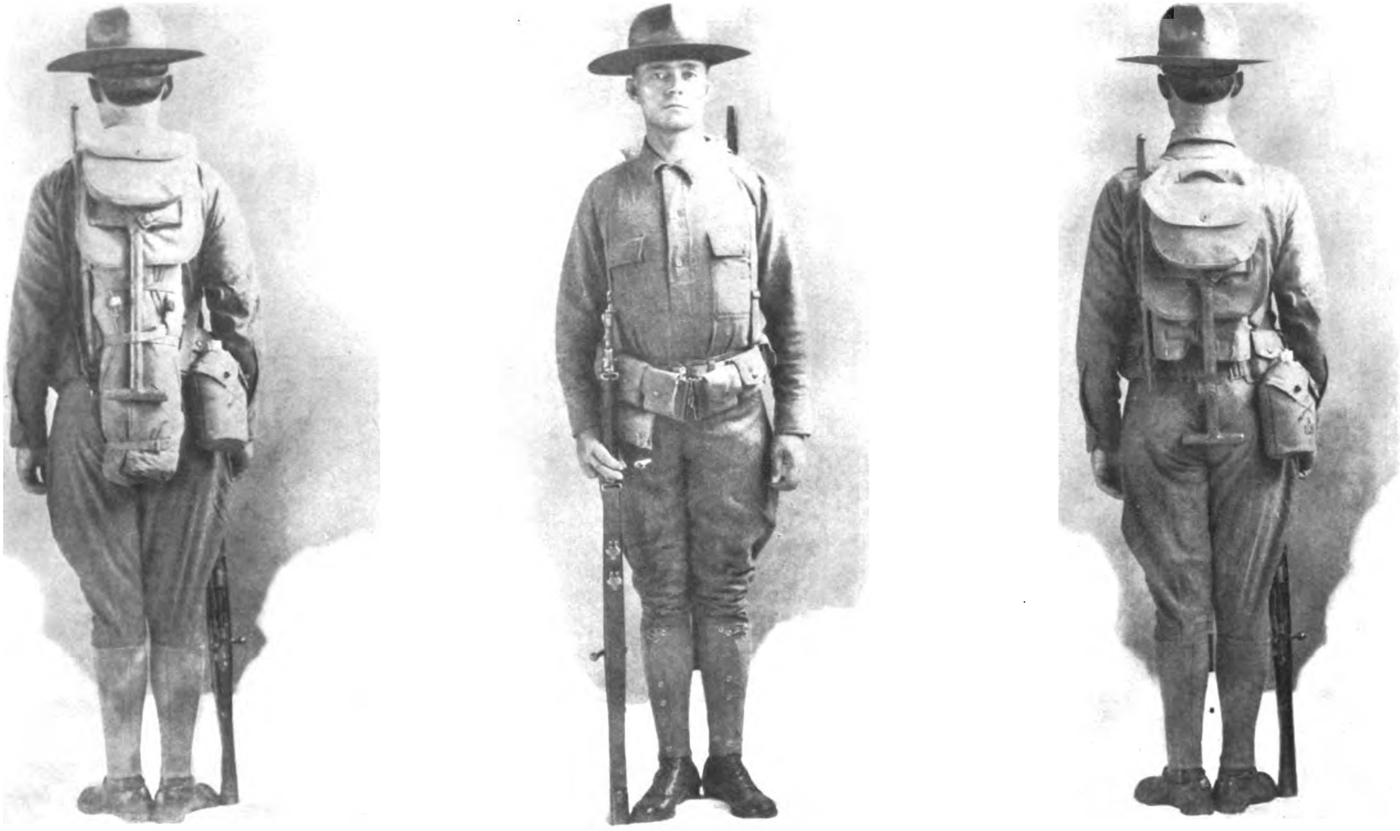
By the middle of the eighteenth century Prussia had taken the place which Sweden held a century before as the pattern of excellence for infantry. Frederick the Great was a strict disciplinarian, and for that reason he discouraged open fighting and aimed at mechanical precision. However, this precision was of very

INFANTRY



TYPICAL INFANTRYMEN OF EUROPEAN ARMIES

INFANTRY



UNITED STATES INFANTRY SOLDIER

SHOWING EQUIPMENT CARRIED ON THE MARCH AND IN COMBAT.

great importance in rapid loading and firing, and Frederick's masterpiece in defeating the Austrians at Leuthen was made possible by the strict Prussian drill. In 1771 Frederick issued instructions for the guidance of his officers, in which he shows an appreciation of the effect of infantry fire as a means of winning battles, and to him is due the credit of initiating the use of horse artillery as an aid to infantry.

Henry Bouquet (q.v.) was one of the first men to recognize that light infantry was needed for American warfare and that much could be learned from the Indians. Lord Howe developed these views, and in the expeditions against Louisburg and Quebec light infantry played a leading part. As a result of the early Indian wars and the War of American Independence, the practice of forming infantry in two lines instead of three was introduced.

The period around the French Revolution (1792–1815) gave further proof of the value of light infantry, and the skirmisher played the leading part in the struggles of that memorable period. After the Peace of 1815 there was a reaction towards the rigid close-order drill of the old school; but this was for a short time only, and about 1850 the methods of skirmishing, the full development and maintenance of infantry fire, and its use in combination with the action of artillery and cavalry had become the chief military problem.

The Crimean War and the War of Italian Liberation were fought with better infantry weapons and further showed the value of infantry-fire action. During the great American Civil War the infantry on both sides was at first practically worthless, but experience wrought them into splendid fighting troops. The battalions were deployed, and attacks were made in line, covered by skirmishers. The infantry opened out as it advanced to the attack, and gained ground by rushes. Bayonets were rarely properly used, and the actions were almost always decided by infantry fire. This war showed plainly that, with arms of precision, looser fighting formations, advances by rushes, dismounted action of cavalry, and increased use of infantry intrenching tools were military problems of very great importance.

The Franco-Prussian War (1870) found Germany with perhaps the finest infantry that had ever been seen, and, although the French had by far the better rifle, their infantry had not been well trained, and the battle of Wörth, in which MacMahon was driven from the field with the loss of nearly half his army, was one of the conspicuous results.

The Russo-Turkish War (1877) afforded another means of judging of the effect of rifled breechloaders. The Turks were inferior in organization and numbers, but their infantry possessed the better rifle, and in the engagements around Plevna Russia suffered severe losses as a result.

The War in South Africa (1899) was a brilliant example of what men skilled in the use of small arms can accomplish. This war settled many doubtful points about infantry training. One thing, however, was clear, and that was the fact that the British infantry soldier was no match for the Boer as a skirmisher; it was plain that the extension of infantry would have to be carried much further than had ever before been thought necessary, and that the discipline should become less mechanical and more intelligent. It is interesting to note that "infantry training" was promptly substituted for "infantry drill" in the British army.

The French infantry drill regulations of 1902 and 1904 were aimed at simplification and the development of initiative in infantry training. Captains were allowed more liberty in training their men, and fire control was recognized as being of vital importance. During the Russo-Japanese War (1904) the fighting was done mainly by infantry, and this war further emphasized the necessity for simple and direct methods for infantry in combat and the great importance of individual training.

From the foregoing it will be seen that those armies which had their proper proportion of well-trained infantry were victorious generally in all ages. An army is nothing more than a machine composed of many parts, and in order to insure victory each part must do its proper share of the work. The infantry is recognized as the "backbone" of every army, and its importance increases with every improvement in arms; upon its training and efficiency depends the fate of practically every battle. Cavalry, artillery, engineers, signal troops, and all of the various others are but auxiliaries which work with a view to assist the infantry to close with the enemy and deal the decisive blow. The old idea, so prevalent in America, that it is only necessary to arm a man and send him forth to battle and count him a soldier, was long ago abandoned by those nations which have given to the subject proper thought. The idea, too, that comparatively little training is necessary to convert a recruit into a true infantryman has been discarded by most of the leading nations. Were further proof needed of this, it was found in the Great European War of 1914, and the prolonged drill and training which the British volunteers received before being sent to the front may be cited. Indeed, this war seemed to have many lessons in not only the training, but the equipment and employment, of the modern foot soldier, and the tactical changes and studies, which will be found treated in the military discussion under WAR IN EUROPE, should be consulted in this connection.

Modern combat demands the highest order of training, discipline, leadership, and morale on the part of infantry; it must take the offensive to gain decisive results, and in the local combats which make up the general battle that infantry which is the better trained in the use of ground, fire efficiency, and discipline will win. Infantry must have the tenacity to hold every advantage gained, the individual and collective discipline and skill needed to master the enemy's fire, the determination to close with the enemy in attack and to meet him with the bayonet in defense. Modern war requires but one kind of infantry—excellent infantry.

The Rôle of Modern Infantry in Battle. It is the business of modern infantry to win battles, and *decisive results can only be obtained when infantry is permitted to take the offensive;* the *defense* may repulse the enemy, but only the attack can annihilate him. On the offensive, combats are generally waged in accordance with the following *plan:*

1. It is necessary to attack the enemy vigorously with troops enough to compel him to take up a *defensive* position, force him to bring up his reserves and to disclose the weak points of his line; at the same time to withhold the

remaining troops under cover—a part for a general reserve and the rest for a powerful effort at the decisive point, keeping the enemy in doubt as to where the decisive blow is to fall. This is called the *preparatory stage;* it may last for hours, and in a great battle it may extend *through several days.*

2. To make a powerful effort at the decisive point with the forces withheld for that purpose. This constitutes the *decisive action,* or main attack.

3. To employ the general reserve to complete the action and with all available troops make a vigorous pursuit, or to avert disaster in case of failure. This is called the *final stage.*

The principal work during an attack is done by the *infantry.* Assisted by artillery, the principal duty of which is to support the infantry in the most effective manner, the infantry works its way from point to point towards the assigned objective. The infantry which is withheld for the main attack should be fresh, and its appearance as it begins the final advance a surprise. It is moved so as to escape observation, by night if necessary, and established under cover as near as practicable to the point from which the attack is to be launched. From this point (*position of rendezvous*) an *attacking line,* strong enough to form the necessary *firing line* and its *supports,* is sent forward. The remaining infantry forms a *reserve* to be used according to the exigencies of the situation. Until fire is to be opened, the attacking line advances in any formation that minimizes losses and occasions no unnecessary delay. The commander of the attacking line determines when fire is to be opened, and in order to secure and maintain a *superiority of fire* over the enemy, the firing line is made as dense as possible (about one man per yard) consistent with effective work *by each rifle;* the losses are constantly replaced from the supports which follow the firing line as closely as possible, and which, when fire is opened, constitute from *one-fourth* to *one-half* of the attacking line.

The infantry rarely opens fire until well within effective range of the hostile position (1200 to 600 yards), but from that moment its fire, assisted by that of the artillery and other infantry, firing over the heads of the attackers, must be superior to the enemy's fire or success cannot be assured; in fact, the defenders must be practically blinded by a hailstorm of bullets and fragments. This requires a constant, accurate fire from the advancing line.

In order to maintain this fire, avoid heavy losses, and at the same time *continue the advance,* ground to the front is gained by rushes of parts of the line, varying from battalions to individuals according to the intensity of the enemy's fire; but superiority of fire must be maintained during these rushes, as it is absolutely essential to the success of the attack.

The *reserve,* in close formation, follows the attacking line as long as it can find cover, and at the proper time from it a second line is sent forward in time to join the attacking line in the final assault and to secure the captured position. If the attacking line is temporarily checked, it hastily intrenches, and the intensity of the artillery covering fire must be increased to keep down the fire of the enemy. *Ground to the front once gained should never be abandoned until all hope of final success is gone.* As the attack progresses, part of the artillery is moved up to successive positions to render more effectual aid in keeping the enemy down, so that the attacking infantry may close with the enemy and, if need be, dislodge him in a hand-to-hand bayonet fight.

When the attacking line arrives within "charging distance" (somewhere between 25 and 100 yards of the enemy's position), it opens a rapid fire, bayonets are fixed individually, with the least possible interruption of fire, and the united lines charge with fixed bayonets to consummate the attack.

When the attacking line nears the enemy's position, it becomes necessary for the artillery to increase its range so as to impede the movements of possible hostile reserves and to spread confusion in rear of the enemy's position. Under favorable conditions the artillery can continue its fire on the enemy's position until the advancing infantry is about 300 yards therefrom.

When the attacking forces succeed in carrying the enemy's position, they will be at a disadvantage for a moment; there will be much confusion, the troops will be exhausted, and many officers will be gone. If the defender, reenforced by fresh reserves, takes advantage of this moment, he may be able to turn the tide of battle. Here the general reserve must be brought forth to clinch the victory and to prosecute a vigorous pursuit of the enemy, while the attacking troops should be promptly reformed, their ammunition supply replenished, prisoners removed, and the captured position made secure against counter attacks, and thus the *final stage* of the battle completed.

When the enemy's works cannot be reduced by artillery, the fire of that arm has little effect until the infantry advances and compels the defenders to expose themselves; and when his works cannot be captured by open assault, the infantry advances by slow and tedious siege operations.

Bibliography. Hohenlohe, *Letters on Infantry* (London, 1892); E. M. Lloyd, *Review of the History of Infantry* (New York, 1908); *The Infantry Journal* (Washington, 1911–12); William Balck, *Infantry Tactics* (Leavenworth, Kans., 1911); United States War Department, *Infantry Drill Regulations* (Washington, 1911); id., *Field Service Regulations* (ib., 1913); M. B. Stewart, *Physical Development of the Infantry Soldier* (Plattsburgh, N. Y., 1913); Upton, *Military Policy of the United States* (Washington, 1913). See TACTICS, MILITARY; ARMY ORGANIZATION; ARMIES; WAR IN EUROPE, where a critical discussion of the part played by the infantry as well as the other arms in the War of 1914 is given; and the section on *Army* under the articles on the various countries.

INFANTRY, MOUNTED. A general term applied to soldiers trained to fight on foot, but provided with horses, mules, camels, carts, bicycles, or other means of transportation, in order to give them greater mobility than regular infantry; nothing more than regular infantry provided with a more rapid means of transport. Although modern infantry is very powerful, it is very slow in its movements. It has long been recognized that a very great advantage will accrue to that side in a battle which can rapidly move a strong body of men to a decisive point and put them into action as infantry. Hence the idea of mounting infantry.

The absolute necessity for the dismounted action of mounted troops, or of foot soldiers possessing a high power of mobility, has been felt in all ages, and under Napoleon especially, the constant endeavors to produce a "dragoon" for this service were very persistent, though little success was accomplished.

The Americans in 1862–64 were conspicuously successful in the use of mounted infantry; the so-called cavalry during the Civil War being in reality nothing more than good mounted infantry. It would appear that the dismounted action desired is the peculiar duty of cavalry alone, who are now trained to act on foot, and such is largely the case in the American army; but all that can be demanded of cavalry is that it should be able, when occasion requires, to render such services; cavalry can ill afford to be drawn into sustained combats, or attempt, when dismounted, to cope for any length of time with the enemy's infantry. By no process can cavalry compete with infantry under conditions favorable to infantry fighting.

It is imperative that mounted infantry should preserve their identity as infantry, as their great efficiency lies in their ability to ride only well enough to get over such ground as is required, and to make the very best use of their firearms on foot when collision with the enemy becomes necessary.

Few countries have given the subject of mounted infantry thorough attention. Gen. Sir Henry Havelock-Allan, an able English military writer, in 1866 classed the use made of mounted troops in the American Civil War as one of the three leading military questions of the day, and England was the first European country to raise a modern mounted infantry regiment. The Prussians to a limited extent followed suit. The Russian "dragoon" has by many been looked upon as a model mounted infantryman. However, the Boer War (1899) fully demonstrated the great importance of mobile infantry. The Boer skirmisher possessed mobility to a marked degree, while, on the other hand, perhaps the best army that had ever left British shores was practically paralyzed owing to its lack of mobility. This British defect was gradually overcome, and in the second phase of the war, when Lord Roberts advanced from Bloemfontein on Pretoria, three-tenths of his command consisted of cavalry or mounted infantry; his success was largely due to the fact that his mounted men did most of their fighting on foot, seizing points of vantage and holding them until reënforcements came up.

The rôle of mounted infantry is generally *offensive.* When an enemy has occupied villages, buildings, defiles, or bridges, which cannot be turned, when nothing can be effected by the mounted action of cavalry, mounted infantry may be usefully employed. The infantry soldier, with his magazine rifle and careful training in musketry, is able to deal with an enemy's infantry in a manner which cavalry, armed with carbine and equipped for mounted service only, could not hope to attempt.

The most important uses of mounted infantry may be summarized as follows: (1) to accompany the cavalry in rapid movements, in order to seize positions, threaten or attack flanks or communications, and to act with cavalry in the pursuit of an enemy; (2) to reënforce rapidly and at a critical moment infantry which is overtasked, or which has succeeded in gaining some vantage ground in the general line of attack, and which requires assistance to make good its footing; (3) to overtake a retreating enemy and force him to turn and fight; (4) to enable a commander to disengage his infantry from action. Mounted infantry is also very valuable in relieving infantry of much wear and tear in marching to and from outpost positions and of many fatiguing duties incident to advance-guard work.

Bibliography. E. T. H. Hutton, *Mounted Infantry: Its Present and Future* (Aldershot, 1889); B. L. Anley, *Practical Hints for Mounted Infantrymen* (London, 1902); H. H. Pall, *Further Training and Employment of Mounted Infantry and Yeomanry* (ib., 1902); W. J. Otley, *With Mounted Infantry in Tibet* (ib., 1906).

IN'FANTS, Feeding of. The proper food for a young infant is its mother's milk. The infant should be put to the breast a few hours after birth, for though the milk does not appear until the third day, the colostrum is quite enough for the child's needs. The colostrum is rich in fats and is also laxative, both wisely provided by nature. The infant will get from four to six ounces daily for the two days before the normal milk appears. Nursing is physiologically necessary for the mother and the child. The child should have no water, sweetened or otherwise, as it will lead to colic and indigestion besides lessening the vigor of nursing. Should the milk not appear on the third day or be insufficient in quantity, give the mother gruels of corn meal or oatmeal or some preparation of malt with hypophosphites of lime and soda.

Should the mother die or there be conditions that make nursing impossible, substitute feeding must be resorted to. Wet-nursing is no longer popular in America, owing to the possibility of the nurse bringing disease into the household, to say nothing of domestic discord. Moreover, the child of the wet nurse is likely to die as the result of neglect or unwise feeding. Should such a nurse seem essential, she should be subjected to the tuberculin test for tuberculosis and the Wasserman test for syphilis. Mother's milk is the perfect food and is found to contain fat 4 to 5 per cent, proteid 1 to 2 per cent, sugar 6 to 7 per cent, and 1½ per cent of salts or ash. Cow's milk is similar to human milk; but its ingredients are in different proportions, the fats and sugar being one-third less and the proteid twice as high. Moreover, the proteid is a compound body composed of casein and lactalbumen; the former predominates in cow's milk and the latter in human milk. The former is difficult of digestion, the latter is soluble and readily absorbed.

Milk is therefore "modified" to overcome the unlike features. This is easily done by diluting the top portion of milk allowed to stand in a quart bottle until the cream has risen. During the first week a suitable formula would be top milk 3 tablespoonfuls, i.e., an ounce and a half, milk sugar half an ounce, and pure water 10 ounces; divide in 10 bottles and feed every two hours. At one month use 9 ounces of top milk, 2 tablespoonfuls of milk sugar, and of water 23 ounces; divide in eight bottles and feed every three hours. At six months take 15 ounces of the top milk, 7 teaspoonfuls of milk sugar, and 17 ounces of pure water; divide in six bottles and feed every three hours.

The one-month formula contains fat 4 per cent, sugar 7 per cent, and proteid 1.5 per cent. That gives more than 600 calories as the daily food allowance. The six-month formula also represents more than 600 calories. An infant requires 40 or 45 calories of fuel per pound weight each day. An adult needs about one-third as much per pound, it being true that the smaller the animal the greater the proportionate loss by radiation. A restless or crying baby consumes more food than a quiet one, but grows less. A well infant was found to radiate 30 to 45 grams of perspiration per hour, while a restless and crying one radiated five times as much. After all, only 9 per cent of the energy taken into the body is retained for growth; 80 per cent is eliminated.

An infant should be weighed twice a week while small and once a week when older, in order to know whether it is growing and increasing in weight properly, i.e., at the rate of an ounce and a quarter a day. The average weight at birth is 7.5 pounds, at one month 9 or 10 pounds, at six months 15 pounds, at one year 18 or 20 pounds. The following table, compiled from authoritative sources, shows approximately the composition of the more common artificial foods in use compared with milk:

COMPOSITION OF INFANT FOODS WITH CALORIC VALUE

	Proteid	Fat	Sugar	St'ch	Salts	Calories per oz.
Woman's milk.......	2.0	4.0	7.0	...	0.2	22
Cow's milk..........	4.0	4.0	4.5	...	0.7	22
Horlick's malted milk	16.5	9.0	68.0	...	3.9	135
Mellin's food........	11.5	0.2	80.0	...	3.6	120
Eskay's food........	6.0	1.0	68.0	21.0	1.3	128
Imperial granum.....	14.0	1.0	2.0	73.5	0.4	120
Nestle's food........	11.4	4.4	51.3	28.4	1.7	120
Barley water........	0.09	0.05	...	1.63	0.03	2.19
Mead's dextri-maltose	...	...	*51.0	†47.0	2.0	120

* Maltose. † Dextrin.

A study of this table shows clearly why some foods are not enough for some infants and how to remedy the matter. The proprietary foods are nearly all deficient in fats. This may be overcome by making up the mixture with milk or cream, especially for young infants. Occasionally milk preparations undergo changes and persist in causing indigestion so that they must be given up entirely for a time. In such an event barley water is substituted for a few days (barley two tablespoonfuls to one quart of water). When there is need of energy, but digestion is weak, dextro-maltose may be given.

The milk must be not only clean to look at, but free from disease germs and bacteria that cause fermentation or decomposition. In cities it is best to use "certified milk" or pasteurized milk. Pasteurizing is heating to 165° F. for 20 minutes. This will destroy the germs of diphtheria, typhoid fever, and tuberculosis, also the streptococci, staphylococci, and the lactic acid group of bacilli. Milk containing 100,000 bacteria to the cubic millimeter is unfit for use, 10,000 being all that should be allowed. Special milk is produced with less than 1000 to the cubic millimeter. After pasteurizing, the milk should be kept at a temperature near 41° F. to prevent the development of spores that may have escaped destruction during the heating.

There are numerous processes of modifying milk and many methods of computing ratios and values. These are too technical for this article, but may be found in the following books: Holt and Howland, *Diseases of Children* (New York, 1911); Pfaundler and Schlossman, *Diseases of Children* edited by Shaw and LaFétra (Leipzig, 1912); C. G. Grulee, *Infant Feeding* (Philadelphia, 1914).

INFANT SCHOOL. An educational or, rather, charitable institution which sprang up during the latter part of the eighteenth and early part of the nineteenth century, at first on the Continent and later in Great Britain and in the United States. The object was to care for neglected children of early age, especially those of factory women, who were left with few physical comforts and no moral oversight. Such children were gathered together during the day, and, in order to render their care less irksome, they were taught to march, to perform simple gymnastic exercises, to sing simple songs, to repeat the multiplication tables, names of the days of the week, and similar things, and in later years at some places to read and sew. The educational purpose was purely secondary, at least until the influence of the Pestalozzian ideas prevailed in the second quarter of the nineteenth century. There is no historic connection with the origin of the kindergarten (q.v.).

The first infant school was founded in 1780 by Oberlin (q.v.), the pastor of Walbach in France. He appointed women in his own parish to assemble the children between the ages of two and six and to interest them, by conversation, in pictures, maps, sewing, etc. In Great Britain the first infant school was opened (1800) by Robert Owen in connection with his communistic establishment at Lanark, Scotland. In 1827 the Glasgow Normal Seminary was founded by David Stowe to carry out this idea of the infant school. In 1819 a similar school was established in London in charge of Wilderspin, under the patronage of such men as James Mill, Zachary Macaulay, and Lord Brougham. Other schools soon followed, and in 1836 this movement was unified in the formation of the Home and Colonial Infant School Society, which contributed more than any other instrumentality to the extension of the infant school by training teachers and instituting model schools. Up to this time the movement had succeeded by keeping distinct the processes of training and instruction and by not attempting any educational work of the latter character. The society was the outgrowth of the influence of the Mayos, brother and sister, one of whom had been a student of Pestalozzi at Yverdon. Thereafter the work of the infant school was to include instruction after the Pestalozzian methods. Under the educational grants of Parliament many infant schools were established, and especially since the Royal Commission of 1858–61 they may be considered as a component part of the British school system. Within recent years the infant schools have undergone considerable reform, and in place of the formal work in the three R's the infant schools are absorbing slowly the spirit of the better type of kindergarten. In continental Europe it is the kindergarten built upon Fröbelian lines that is very generally established. In France, however, the public *crèche*, which is for children of two and three years of age, is very general. The *école enfantine* for children of four and five years of age is a kindergarten. Such schools, as distinct parts of school systems, will be described under the title NATIONAL EDUCATION, SYSTEMS OF. In the United States the first infant school was established in Boston, in 1826, under A. B. Alcott. While this school was a marked success, and there were numerous similar attempts in various other American cities, there was no great demand for such institutions in a population not primarily urban and engaged in manufacture. Similar needs were met by the Sunday school and, before there arose any great need for the charity infant school, by elementary public schools with free tuition.

Consult: Wilderspin, *Infant System* (London, 1840); id., *Education of the Young* (ib., 1840); Gill, *Systems of Education* (Boston, 1887); England, Board of Education, *Special Reports on Educational Subjects*, vols. viii, xxii (ib., 1902, 1910); Salmon and Hindshaw, *Infant Schools* (ib., 1904); I. L. Kandel, *Elementary Education in England* (Washington, 1914). See, also, KINDERGARTEN; NATIONAL EDUCATION, SYSTEMS OF.

INFEC'TION (Lat. *infectio*, a dyeing, from *inficere*, to dye, mix, from *in*, in + *facere*, to make). The condition produced by the entrance into and multiplication within the body of pathogenic microörganisms, whether bacteria or protozoa. Every infectious disease has its infectious element. This element may be propagated by contagion from particles carried by the air, as where the virus of the disease clings to scales of epidermis in scarlet fever or smallpox; it may be propagated by contagion from fæcal matter in which the virus is discharged, as in typhoid fever or cholera. Whether microorganisms can be transmitted after elimination in the breath is yet uncertain. Probably they can be detached from mucous surfaces by the currents of the breath, freed by expulsive coughing. The mode of elimination of the virus from the body decides whether the disease be contagious or not. The significance of the question of the reproduction of infectious microörganisms outside of the body is great. Drinking water may be contaminated with typhoid-fever germs; milk may be contaminated with pus germs. The virus of some diseases may be carried by the air, as in the case of pulverized sputa of tubercular patients. Many protozoan diseases, such as malaria and yellow fever, are carried by insects. Actual contact with the agents of infection, however, constitutes the chief means of infection. Predisposition plays a secondary part as a factor in such causation. Race influences susceptibility to disease. The size of the dosage of bacteria is important, a large injection producing disease where immunity to small doses exists.

Auto-infection occurs where in a parturient woman, e.g., septicæmia occurs as a result of infection of the uterus with pathogenic germs which have gained entrance into the vagina. See IMMUNITY; CONTAGION; INSECTS, PROPAGATION OF DISEASE BY.

INFEC'TIOUS DISEASE. A disease which is communicated by means of bacteria or protozoa which enter the body. A contagious disease is propagated by means of virus carried from person to person upon mucus from the mouth or respiratory tract, upon scales from the skin, etc. Contagious diseases include measles, smallpox, scarlet fever, tuberculosis, etc. On the other hand, typhoid fever and cholera are not contagious. They are transmitted through the use of drinking water or food containing the germs of each disease. All the diseases mentioned are infectious, including those of the contagious class. See INFECTION.

INFECUNDITY. See STERILITY.

INFEFT'MENT AND SA'SINE. A Scottish law term, corrupted from the "feoffment" and "seisin" of the feudal law of England and employed to denote the formal act whereby the title to land was formerly conveyed. It consisted in the symbolical transfer of possession by handing over a twig or clod of earth in token of the land conveyed. The instrument of sasine was the notarial instrument, or deed, embodying the fact of infeftment. But now the necessity of a separate formality is unnecessary, it being sufficient to register a conveyance in the register of sasines in Scotland. In England there is no similar register for deeds, and the title is complete when the conveyance is executed and delivered to the purchaser. In Scotland an *infeftment in security* is a conveyance in the nature of a mortgage to secure payment of an obligation, and an *infeftment of relief* is a similar security to protect a surety or bondsman against his contingent liability.

INFEOFFMENT, ĭn-fĕf'ment. See FEOFFMENT.

IN'FERENCE (ML. *inferentia*, inference, from Lat. *inferre*, to infer, from *in*, in + *ferre*, to bear). In logic, the process of so coördinating and systematizing one's knowledge that new knowledge is thereby gained. Inference may be induction or deduction. See INDUCTION; DEDUCTION.

INFERIOR COURTS. In England courts of common law over which the superior courts (formerly known as the courts of King's Bench, Common Pleas, and Exchequer, now by statute consolidated in the Supreme Court of Judicature) exercise a supervisory jurisdiction by writs of mandamus, certiorari, prohibition, or similar writs. These include local courts, such as borough and county courts, courts baron, the City of London Court, the Mayor's Court of London, the University courts, and many others of like character throughout the kingdom.

In the United States the expression is used in the same sense and comprehends usually magistrates courts and courts of special sessions as well as county, city, and other courts of a local character and of a limited jurisdiction, civil or criminal. See COURT.

INFER'NO, THE. See DANTE ALIGHIERI.

INFILTRATION. See DEGENERATION.

IN'FINITE (Lat. *infinitus*, boundless, from *in-*, not + *finitus*, bounded, from *finire*, to bound, from *finis*, bound, from *findere*, to cleave; connected with Skt. *bhid*, to split, Goth. *beitan*, OHG. *bizzan*, Ger. *beissen*, AS. *bītan*, Eng. *bite*). In philosophy, a term used in various senses, while at the same time there has been much discussion as to the reality of any object denoted by the term. The extended objects of our ordinary perception do not occupy all the span of our field of vision. They have outlines which mark off their area from circumjacent space. And so with temporal magnitudes. Objects last for a longer or shorter period, before which they were not experienced and after which they are no longer experienced. Their duration is finite, because set off by limits—i.e., by their initial and final moments. Intensive magnitudes also are conceived by analogy as finite. Thus, I hear a sound which is followed by a louder one. In this case the less is not marked off from the greater by limits. It is not a part of the greater, although it may be that the space traversed by the vibrations of the air which cause the lighter sound is part of the space traversed by the vibrations which cause the louder sound. Whatever may be the reason that makes us use in the case of these so-called intensive magnitudes the same terminology (e.g., greater and less), there is no doubt that we do so speak of a "finite" intensity whenever we conceive of a greater intensity as possible, although here the less is not included in the greater, and therefore it is not marked off or limited within the compass of the greater. It is important to keep this distinction in mind, for corresponding to this distinction we have two senses at least of the word "finite" and of course as many possible senses of the word "infinite." 1. The infinite is that which is not an extended or enduring part of some larger extension or duration. Now, if this be the meaning of infinite, we may say there are possible two kinds of infinites, (*a*) those which, though spatial or temporal, are not parts of larger spatial and temporal wholes, and (*b*) those which are not spatial or temporal at all. The most promising candidates for inclusion under (*a*) are "infinite space" and "infinite time" and "infinite number." Under (*b*) would fall all intensive qualities. For instance, the loudness of any auditory sensation would be infinite in this sense, although the duration of the sensation and the distance at which the sound is heard are both finite.

2. The infinite is that which, having intensity, exceeds everything else in intensity. An infinite sound in this sense would be a sound which had a loudness surpassing that of all other actual or possible sounds. Infinite heat would be a heat-temperature sensation surpassing in intensity all other actual or possible sensations of like sort; and so with the affections and the emotions. Now, with given conditions—i.e., a certain sentient and affective organism in a given state—there is something that corresponds to this definition. A sound of a certain definite degree of loudness is the loudest sound a particular sentient being can hear. A greater wave length of air could not be heard. But no one seems disposed to call such a sound one of infinite loudness. Again, we can "bear" pain up to a certain point, differing in individuals. Beyond that point we become insensible.

3. Still another sense of the infinite is the unconditioned. Everything that appears in experience is conditioned; it is what it is because other things are what they are; but in contrast to these conditioned realities some philosophers of almost all ages have believed in a reality lying behind experience and having a self-subsistent character not defined by any qualities that appear in experience. Herbert Spencer's (q.v.) unknowable is an infinite of this character. Such an infinite is sometimes called an abstract infinite—abstract because it is without any definite positive quality, and because it is considered to have its essential being in separation from the concrete world we know.

4. Still another meaning of the infinite is the unattainable limit of an unending process of construction. This is well illustrated in the view taken by some idealists that time and space are constructed in the act of thinking them. This construction is conceived, not as complete, but as having no limit to the possibility of its continuance. Infinite space is thus the unattainable result of the unending process of constructing space. It is the fact that you can never come to the end of possible space construction. One species of the mathematical infinite seems to fall under this head. Thus, in the improper fraction $\frac{1}{x}$, as the value of x decreases by one-half, the value of the fraction is doubled. If the decrease is continued without end, the fraction is conceived as approaching infinity. Here, again, infinity is the unattainable result of the unending process of halving the denominator. This infinite differs from the infinite of space and time considered under (*a*) in that space and time are often regarded as existing apart from any construction on our part, while the former is considered simply as the algebraic expression of the fact that our construction can continue without end. It is not considered as an actual reality, but as an unattainable ideal, while infinite space and infinite time are by some realists considered to be actual facts.

5. Infinite in another sense is any member of an all-inclusive system of reciprocally determining members. Thus, according to Hegel, all reality is infinite. Hegel justifies the use of the term by pointing out that in a true system any member in being determined by the other members is really self-determined, because its systematic relation to the other members is an integral constituent of its own nature. These other members exercise no foreign compulsion upon it to make it what it is. They determine it only because it is part of its own being to be so determined. They do not set limits to it which it may not pass, but they give it opportunity to be itself. To take one of the apparently most refractory instances, the billiard ball is not infinite in sense 1*a*, because, though spatial, its place is only a part of a larger space from which it is marked off by definite boundaries. But the ball is something more than so much space. It is an object that undergoes various changes under certain conditions—e.g., when struck it rolls. This dependence of its changes upon the action of other objects is often considered another evidence of its finitude. But Hegel would have pointed out that it is only because it is the nature of the ball to roll when struck that it rolls at all. In rolling it does not succumb to external force, but it acts its own part. Though determined, it is self-determined. Though compelled, it is free. This free, self-determined nature of every member of any free system is what Hegel calls infinite. He considers the term "infinite" appropriate because the systematic conditions which determine the ball's action do not limit it in the sense of repressing its spontaneous tendency to act out its own nature. They simply give it a chance to show one side of its nature in a certain definite movement. There is no reason why the term "infinite" should not be employed in this case. But there is every reason to remember that this sort of infinitude is thoroughly compatible with finitude in another sense, e.g., spatial. When Hegel says that the finite is essentially infinite, he means that what is conditioned (*bestimmt*) is conditioned because it is its very nature to act in response to these conditions; that condition is not restraint (*Schranke*) of an inherent tendency by an external limit (*Grenze*).

6. In recent mathematics (see Series) the term "infinite" is applied to any series of terms such that for every term in the series there is a corresponding term in some part of the series. Thus, the series of number integers is infinite in this sense because, e.g., corresponding to every integer there is an *even* number in the series of even numbers, which series is a part of the larger series of integers. This definition of infinite, developed by such mathematicians as Cantor (q.v.) and Couturat, is now adopted by many philosophers.

A reader in philosophy must keep himself always on the alert to detect the various meanings of the word "infinite," and then he will be able to understand many paradoxes that at first appear to be logical contradictions. Whether the infinite really exists depends on the kind of infinite you mean. The existence of infinite 1*a* is discussed elsewhere (see Number; Space; Time); infinites 1*b*, 2 in at least certain cases, and 5 are unquestionable. Infinite 3 is, if it does exist, unknowable, and there is no positive empirical reason to assert its existence. Infinite 4 does not exist at any particular time from the very nature of the case, because it is an unattainable ideal. The infinite process is real at least in the case of time in the sense that the flow of time never ceases; but at no moment has it completed its unending course, and in this sense infinite time does not now exist, nor ever has existed, nor ever will. But when the present tense is used not specifically but universally, it is then true that there is infinite time. Any further treatment of the question of infinity would be out of place here.

Consult: Hegel, *Wissenschaft der Logik* (Berlin, 1841); Bolzano, *Paradoxien des Unendlichen* (Leipzig, 1851); Couturat, *De l'infini mathématique* (Paris, 1896); J. Cohn, *Geschichte des Unendlichkeits-Problems im abendländischen Denken bis Kant* (Leipzig, 1896); Moritz Cantor, in *Mathematische Annalen*, vols. xlviii, xlix (ib., 1896); Josiah Royce, *The World and the Individual* (New York, 1900–01); F. H. Bradley, *Appearance and Reality* (2d ed., ib., 1902); Geissler, *Die Grundsätze und das Wesen des Unendlichen in der Mathematik und Philosophie* (Leipzig, 1902); Russell, *Principles of Mathematics* (Cambridge, 1903); Whitehead and Russell, *Principia Mathematica* (ib., 1910–13); Bernard Bosanquet, *Logic* (2d ed., 2 vols., Oxford, 1911).

INFINITE SERIES. See Series.

INFINITY AND THE INFINITESIMAL (Lat. *infinitas*, from *infinitus*, boundless). A number conceived to be greater than any assignable number, however great, is called an infinite number. The symbol ∞, meaning indefinitely great, cannot be used in operations as a finite number; e.g., $\infty - \overline{\infty}$ is not necessarily zero, and $\frac{\infty}{\infty}$ is not necessarily 1. A number that varies and becomes and remains smaller in absolute value than any assignable number, however small, is called an infinitesimal number. The use of the symbol 0 is also limited; e.g., $\frac{0}{0}$ is not necessarily 1. (See Fraction.) In modern geometry the notion of infinite points and infinite lines has led to great generalization and supplied the condition for continuity (q.v.) of many relations; e.g., for the statement "Two coplanar lines are concurrent or parallel" may be substituted "Two coplanar lines are concurrent in a finite or an infinite point." In modern analysis the infinitesimal has played an important rôle. From the time of Kepler mathematicians have struggled with the infinitesimal, especially as employed in the differential calculus, and some, notably Lagrange, have tried to avoid its use entirely. But through the efforts of Legendre, Gauss, Carnot, and especially Cauchy, the meaning of the propositions concerning infinitesimals has been established, and a safe foundation for the differential calculus has been laid. See Calculus.

INFIRM'ARY. See Hospital; Dispensary

IN'FLAMMA'TION (Lat. *inflammatio*, from *inflammare*, to set on fire, from *in*, in + *flamma*, flame; connected with *flagrare*, Gk. φλέγειν, *phlogein*, to blaze, Skt. *bhraj*, to be bright). A morbid condition characterized by altered function of the elements of the tissue involved, changes in circulation, derangement of local nutrition, and generally an exudation infiltrating the tissues affected. It is a process of extreme complexity, presenting variations depending upon the exciting cause and upon the kind of tissue in which it occurs. It is therefore impossible to define it satisfactorily. The most obvious symptoms or phenomena of inflammation, when it attacks an external or visible part, are pain, redness, heat, and swelling, together with altered function. The general characters of the process will be best understood by an assumed case. If a healthy man has a splinter of wood or any other foreign body embedded in any fleshy part, he begins to experience pain at the part, and this is soon succeeded by redness of the skin, a firm and extremely tender swelling at and around the spot, and a sense of abnormal heat. These purely local symptoms are succeeded, if the inflammation reaches a certain degree of intensity, by a general derangement of the vascular and nervous systems, to which various names, such as constitutional disturbance, symptomatic or inflammatory fever, pyrexia, etc., have been applied. If the foreign body is extracted, the probability is that all these symptoms will gradually abate, until the part at length regains its natural appearance and sensations. If, however, the cause of irritation is not removed, or if the intensity of the morbid process exceed a certain point, the following phenomena occur: The swelling assumes a more projecting or pointed form, the part becomes softer, and the skin at its centre, which is usually the most projecting part, becomes whiter. There is a sensation of throbbing pain, and if the skin be not divided with a knife it finally breaks, and a yellow, creamlike fluid, known as pus (q.v.), escapes, after which the symptoms rapidly abate. This process is known as *suppuration*.

If the original injury was very severe and the inflammation intense, there may be actual death of the part affected. In that case the red color of the skin becomes purple or greenish black, the pain ceases, and the part becomes dead and putrid. This is *mortification*. Under favorable circumstances this dead part, which is called a *slough*, spontaneously separates from the adjacent living parts by a process known as ulceration, and the cavity which is thus formed gradually fills up and heals.

The *pain* may vary from mere discomfort to intense agony. There is usually most pain in those parts in which the tension produced by the swelling is the greatest, as under the periosteum, or beneath serous or fibrous membranes, etc. The pain occurring in inflammation is always aggravated by pressure, and by this means the physician can often distinguish between inflammatory and noninflammatory disorders. The *heat* is seldom so much increased as the sensations of the patient would lead him to believe; it does not rise above the maximum heat of the blood in the interior of the body. This increase of heat depends upon the increased flow of arterial (or highly oxidized) blood to the part. The redness depends upon there being more blood than usual in the vessels of the affected part. The *swelling* depends in part upon the distention of the blood vessels and upon the presence of various fluids, such as blood serum and pus, in the tissue of the affected part.

For the study of the details of the inflammatory process and of the sequence of the changes which take place, it is most satisfactory to observe their progress in living tissues. If the mesentery of a frog whose muscular system has been paralyzed by curare be exposed to the air, this unaccustomed exposure starts inflammatory changes which can be observed under the microscope. There is first seen to be an increase in the rate of blood flow through the capillaries; then the capillaries become somewhat dilated, and the blood current becomes slower than normal. White blood cells accumulate along the capillary walls and at various points stop and attach themselves to the endothelial cells. If these white blood cells be watched carefully, some of them may be seen to pass through the cement substance between the endothelial cells and in this way pass out into the surrounding tissues. Some fluid is also seen to accumulate in the tissues, this fluid having evidently come from the fluid elements of the blood. Also red blood cells in greater or less numbers may pass out of the vessels and be found in the surrounding tissues. These elements which leave the vessels and accumulate in the tissues during the inflammatory process are called exudates. Their passage from the vessels into the tissues is known as exudation, and this form of inflammation is often designated exudative inflammation. The passage of the blood corpuscles out into the tissues is called emigration, or diapedesis. The serum of exudation contains the fibrin-forming elements of the blood and so may lead to the formation of more or less fibrin in the tissues. The white blood cells die and disintegrate (as they are especially prone to do in the presence of certain forms of bacteria) and form with the serum the thick, opaque, yellowish fluid that is known as pus, the dead white blood cells being the pus cells. According to the way in which the elements of the exudate are associated and their relative proportion, the inflammation is known as serous, serofibrinous, seropurulent, or purulent. When red cells are present in unusual numbers, the inflammation is designated hemorrhagic inflammation. Such an inflammation as that described in the frog's mesentery may subside on the removal of the exciting cause. The serum is reabsorbed into the blood vessels or lymphatics, the living blood cells find their way back into the circulation, while those that are dead disintegrate and are absorbed. This process is known as resolution. The character of an inflammation is largely modified by the nature of the tissue in which it occurs. Thus, when an inflammation occurs in dense fibrous tissue there is little chance for much distention, and the amount of exudate is limited by pressure. In tissues of looser texture the amount of exudate is apt to be larger. Mucous surfaces such as those lining the gastrointestinal canal, the respiratory tract, and the genito-urinary tract, react to the inflammatory process by at first a decrease in the amount of mucus, following which there is a marked increase of mucous secretion. This being in many cases the dominant feature, the inflammation is designated mucous or catarrhal inflammation. On serous surfaces such as the pleura, peritoneum, and pericardium, the serofibrinous exudate often leads to an agglutination of the opposing surfaces and the formation of adhesions. These adhesions bind the surfaces together and materially interfere with the natural free motion of the parts. Such a condition obtains in the so-called fibrinous form of pleurisy. It is very common after inflammations of the pelvic organs in the female and after appendicitis. These adhesions may become organized by the development of blood vessels in them and so become converted into actual living tissue. In abdominal operations extensive adhesions resulting from present or previous inflammatory processes and binding together the different viscera often offer the most difficult problem with which the surgeon is confronted. In inflammation of the iris the pupil may be rendered irregular or immovable or may be even closed up by the formation of adhesions. In endocarditis, or inflammation of the membrane lining the heart, fibrin may be deposited in wartlike masses upon the valves, thus interfering with their functions and causing some of the worst forms of cardiac disease. See HEART, DISEASES OF.

During the progress of an inflammation, when minute particles of foreign substances are present in the tissues, or where there is decomposition of tissue elements, certain cells, derived probably mainly from the white blood cells, make their appearance. These cells are known as phagocytes and have the power of taking up these particles of foreign matter or of disintegrated tissues and either digesting them or carrying them off for deposit at other points.

The healing of wounds is, in a pathological sense, an inflammatory process. If after a clean-cut wound through tissues which have little vascularity the sides of the wound be closely approximated, there is a little oozing of serum which sticks the cut surfaces together, some of the more injured cells die and disintegrate, while of those which remain intact some proliferate and cross the line of the wound, new connective-tissue fibres are formed, and the whole becomes firmly united. Such healing is known as healing by first intention. If the injury to the tissues is greater, or if the wound is left open, healing takes place in a manner essentially the same as just described, but somewhat more elaborate. Serum is poured out upon the surface of the wound, and intermingled with the serum are red and white blood cells. If bacteria are present, pus is formed. After a varying length of time minute red points begin to stud the surface. These are known as granulations. Each granulation consists of loops of minute capillaries surrounded by newly formed connective-tissue cells. This tissue is called granulation tissue, and its new thin-walled vessels allow it to bleed easily. Over this granulation tissue—if the wound be not too large—the skin slowly extends by growth from the edges of the wound, until complete repair takes place. Such healing is known as healing by granulation or healing by second intention. In some cases the growth of new blood vessels is in excess of the production of the connective tissue, and the tufts of new and easily bleeding vessels project above the surface of the wound. These are known as exuberant granulations, or proud flesh. Young granulation tissue is composed almost entirely of small round or oval connective-tissue cells and blood vessels, the intercellular substance being very small in amount. As the tissue becomes older, the connective-tissue fibres appear, the cells become fewer and more like adult connective-tissue cells. Finally, the cells may almost entirely disappear, leaving dense white fibrous tissue, to which the term "cicatrix," "cicatricial tissue," or "scar tissue" is applied.

Under certain conditions, whether due to increased nutrition of the parts or to some little-understood factor we do not know, there occurs an active increase in the connective-tissue elements of some of the organs of the body. This is known as productive inflammation. This production or new connective or interstitial tissue may be slight in amount. It may, on the contrary, be quite extensive. Its proliferation is always at the expense of the parenchyma or functionating elements of the organ and often results in considerable destruction of the latter. Not easily differentiated from this productive inflammation is the process known as replacement connective-tissue hyperplasia, in which the formation of new tissue is secondary to degeneration of the parenchyma and for the purpose of its replacement.

The significance of the inflammatory process and the relation which it bears to the normal physiological activities of the body are matters of extreme importance. If we exclude bacterial infection with the formation of pus and the production of large amounts of fibrin, which occurs in some cases—in other words, if we take such an example of inflammation as we studied in the exposed frog's mesentery—we note that all the phenomena observed are but exaggerations of normal physiological processes. Thus, in normal physiological activity the relations existing between the blood inside the capillaries and the tissues outside are extremely intimate, and serum and white blood cells, with probably some red blood cells, have more or less free access to the tissues. The action of phagocytes also occurs as a normal physiological process. We have referred to the pathological identity of wound repair and the inflammatory process. Such facts favor the consideration of inflammation, not as a destructive but as a conservative process, a reaction which healthy tissue presents against external irritation. Even in the case of bacterial infection with the formation of pus, the inflammatory reaction is essentially conservative, the white blood cells acting as distinctly germicidal agents, destroying bacteria themselves by their phagocytic powers, and when dead disintegrating and diffusing their germicidal substances throughout the serum or pus. We must thus look upon the inflammatory reaction of tissues in the presence of bacterial invasion as of the nature of a rising of the body forces for purposes of defense against the invasion.

Treatment. In acute inflammations all sources of irritation and all causes of the condition must be sought and removed; local action must be lessened, complications must be avoided or treated if present; pain must be relieved; and the patient's strength must be supported. Rest must be obtained. The patient in an exhausting case must be put to bed; inflamed parts must be supported with bandages, splints, slings, or cushions, securing proper position and slant. In many cases the application of cold is desirable, and this is secured by using an ice bag or ice coil, evaporating lotions, or irrigation with cold water. Heat may be desirable, to favor suppuration and encourage "pointing" of an abscess or a furuncle. But in the case of bacterial infection heat often does harm by lowering the resistance of tissue and inviting further spread of the microörganisms. Poultices especially offer rich ground for the propagation of bacteria. Local bloodletting may be desirable, by means of the artificial leech, cupping, incisions or scarifications, or punctures. Pressure, by means of gauze or rubber bandages, is occasionally indicated. Incisions may be necessary to relieve tension, as in erysipelas, where deep cuts in the axis of the limb relieve pain. Astringent and stimulating drugs may be used, such as belladonna, silver nitrate, tannic acid, hydrastis, zinc salts, etc. Counterirritation is effectual in certain cases, in which the cautery, caustics, vesicants, or rubefacients are used. See Bier's Hyperæmia.

Among the constitutional agents used in combating inflammation are bloodletting in certain cerebral or thoracic conditions; diet; drugs, including aconite, colchicum, belladonna, diuretics, iodide of potassium, opium, quinine, mercury, and purgatives. Stimulants, together with increased nourishment, may be demanded in exhaustion or in chronic cases. The measures appropriate to each disease in which inflammatory conditions arise are mentioned under the appropriate title. Consult A. H. Smith, "Intermediate Inflammatory Process," in *Transactions of the Association of American Physicians* (New York, 1900), and Delafield and Prudden, *Text-book of Pathology* (9th ed., ib., 1911).

INFLAMMATION OF THE BOWELS. An old and inexact term, which was probably used indiscriminately as a name for enteritis, gastroenteritis, colitis, appendicitis, and peritonitis, before some of these ailments were differentiated.

INFLAMMATION OF THE BRAIN. An old and unscientific term, which has been applied to both cerebritis and meningitis, and which should be abandoned. Cerebritis, or inflammatory change of the brain substance, may occur in vascular portions of the brain after injury. See Meningitis.

INFLAMMATION OF THE KIDNEYS. An unscientific term applied indiscriminately to those diseases of the kidneys one of the symptoms of which is inflammation. See Bright's Disease.

INFLAMMATION OF THE LARYNX. See Laryngitis.

INFLAMMATION OF THE LUNGS. See Pneumonia.

INFLAMMATION OF THE MIDDLE EAR. See Otitis Media.

INFLAMMATION OF THE UDDER. See Mammitis.

INFLAMMATION OF THE VEINS. See Phlebitis.

INFLEC'TION (Lat. *inflexio*, a bending, from *inflectere*, to bend, from *in*, in + *flectere*, to bend). The changes undergone by words to denote their varying relations to other words. This forms one of the main divisions of philology and is itself subdivided into conjugation and declension. It is a distinguishing mark of the Indo-Germanic and the Semitic languages, as compared with other language groups, such as the so-called agglutinative (q.v.) and the like. Broadly speaking, the line between inflection and agglutination is drawn by the individual intelligibility of the components of a word. While in many noninflecting languages each of the several formative parts has an independent meaning and existence, as Turk. *sevmek*, to love, *sevdirmek*, to cause to love, *sevdirilmek*, to cause to be loved, *sevdirilmemek*, to cause not to be loved, and so on, the components of an inflecting word no longer have any independent meaning, so that Lat. *agit* means "he drives," but neither *agi-* nor *-t* has any signification when used separately. This distinction, however, is a somewhat artificial and evanescent one and should be accepted only as a basis for rough classification. To all intents and purposes many of the so-called agglutinative, incorporating (or polysynthetic), or even analytic languages are as truly inflectional as those whose right to the term is undisputed. The phrase "inflectional" may nevertheless be used to denote the Semitic and Indo-Germanic groups if its somewhat conventional and inexact applicability be clearly understood. The inflections of the Semitic languages are relatively simple and will be treated in detail under the title SEMITIC LANGUAGES. In the Indo-Germanic family, on the other hand, they are quite complex, although far surpassed by many of the agglutinative and incorporating tongues. In general, the Vedic Sanskrit (see SANSKRIT LANGUAGE) seems to come nearest to the hypothetical pre-Indo-Germanic language type. It has two main declension systems, pronominal (see PRONOUN) and nominal (see NOUN). These were probably independent originally, although by the operation of analogy the two systems of declension frequently became confused, some cases of the noun being inflected pronominally (e.g., Skt. *tē*, Gk. *οἱ*, these, *λύκοι*, but Skt. *vṛkās*, wolves), and vice versa (as Oscan *Núvlanús*, citizens of Nola, *pús*, who? but Lat. *qui*, Skt. *kē*). The inflection of the pre-Indo-Germanic noun and pronoun was evidently far richer even than the Vedic Sanskrit, for a comparison of the Indo-Germanic languages shows a number of terminations for single cases —as, e.g., the instrumental singular Av. *vehrka*, Skt. *vṛkē-ṇa*, Armen. *gailov*, OChurch Slav. *vlŭkomi*, with a wolf. It is entirely possible, even though merely a hypothesis, that the four modes of formation of this case just cited, which would be in pre-Indo-Germanic **u̯l̥qō*, **u̯l̥qē*, **u̯l̥qobhi*, **u̯l̥qomi* (also **u̯l̥qebhi*, **u̯l̥qemi*), indicate an original differentiation of meaning; or, in other words, they were different cases. These cases, if this is true, later syncretized, a process for which the historic Indo-Germanic dialects furnish abundant analogies, as the Latin ablative, which unites the functions of the pre-Indo-Germanic locative, instrumental, and ablative, or the Greek dative, which comprises the primitive dative, locative, and instrumental. The inflectional terminations are, in general, ultimately the same for any given case throughout the various declensions. The apparent divergencies are usually due, except where nouns are inflected pronominally or pronouns nominally, to the phonetic laws of sound combination. (See PHONETICS.) The conjugation of the verb, likewise, was originally far more complex than it is now. The tense system, although the future was originally lacking, was rich, especially in aorists. The Vedic Sanskrit had three main varieties, the simple, reduplicating, and *s-* aorists, of which the first had two subdivisions and the third had four. Here, again, it is quite possible that these seven aorists originally had distinctive meanings, although even as early as the Veda they were, so far as now known, mutually equivalent. The moods were more numerous, the verb having the indicative, subjunctive, optative, imperative, and perhaps a mild imperative called the injunctive (in form the augmentless aorist, and later the augmentless imperfect). As inflection was twofold, so conjugation had a double system, primary and secondary. The primary conjugational terminations were found in the present, perfect, and, when a future was developed, in this new tense also; the secondary endings were employed in the tenses which denote past time.

The older writers on comparative linguistics devoted much attention to the original meanings of inflectional terminations. A deeper research has, however, led to less dogmatic views, and it would seem that in our present state of knowledge no conclusion as to the primitive force of inflections can be reached. It may be true that *s* is characteristic of the plural (as Goth. *wulfōs*, *wulfans*, Skt. *vṛkēṣu*, *vṛkēbhyas*, *vṛkaiṣ*, wolves—nom., acc., loc., abl., instr.), but *s* is also a mark of the nominative masculine and genitive singular (as Lat. *lupus*, wolf, Gk. *ὄφιος*, of a serpent). It is just possible that the case endings were indeed originally independent words, which became stereotyped and meaningless terminations. A possible analogue is furnished by the modern Indo-Iranian languages as compared with the ancient, as Hind. *ghōṛake*, of a horse, corresponding to Prak. *ghōḍaassa kacchē*, Skt. *ghōṭakasya kakṣē*, at the side of a horse, or Pers. *šāhrā*, for the king, corresponding to OPers. *xšāyaθiyahyā rādiy*, for the sake of the king. This, however, is a mere hypothesis, a suggestion of a process which may have taken place. In the case of the verbs repeated endeavors have been made to trace the endings back to the personal pronouns. Thus, the terminations of Skt. *bharāmi*, *bharati*, *bharāvas*, I bear, he bears, we two bear, may be compared with some plausibility with *mām*, me, *tam*, him, *āvām*, we two, but the other persons of the verb oppose such a hypothesis. It is true that many agglutinative languages seem to bear out the old view; but it is, notwithstanding this, too faulty a theory to be adopted as even plausible, much less probable. There is little doubt, however, that certain verb endings arose merely from the juxtaposition of an auxiliary to the original root. Thus, imperfects like the Lat. *amabam*, futures like the Lat. *amabo* and Gk. *δώσω*, and perfects like *amavi* and *duc-si* are composed of the verb "to be" (which is in Skt. *bhū* and *as*, in Lat. *fuo* and *esse*) joined to the principal verb. An example of a more recent formation of that kind may be found in the Fr. future *aimerai*, which is composed of *amare* and *habeo*.

Inflection comes only at the end of an Indo-

Germanic word, excepting in the reduplication of the aorist and perfect (as Skt. *ajījanam*, aorist of *jan*, to be born, *tutōda*, perfect of *tud*, to thrust, Gk. *γέγονα*, perfect of *γίγνεσθαι*, to become, Lat. *memordi*, perfect [aorist] of *mordere*, to bite, Goth. *haihait*, preterite of *haitan*, to call). This reduplication is probably intensive in origin, as is seen in the intensive or frequentative and desiderative conjugations in Sanskrit. The separable initial letter used regularly in Sanskrit and Greek, and sometimes in Armenian, to denote past time when prefixed to a preterite tense (as Skt. *abharam*, imperfect of *bhar*, to bear, Gk. *ἔφερον*, imperfect of *φέρειν*, to bear, Armen. *ekaç* beside *kaç*, preterite of *kal*, to stand) does not properly belong to inflection, and the same exclusion holds true with regard to ablaut (q.v.).

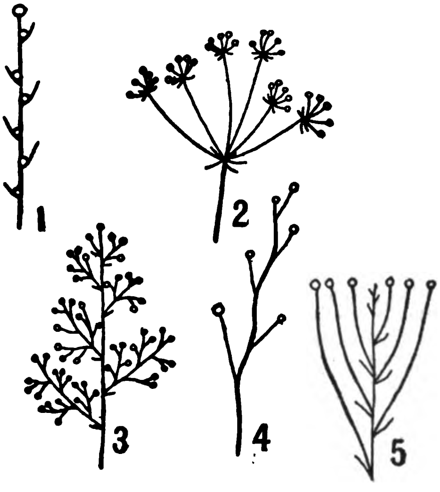
Inflection may, however, be internal and initial as well as final in Semitic. As examples from Arabic, which is the most highly inflected of all the Semitic dialects, may be cited *qatala*, he kills, *qutila*, he is killed, *yaqtulu*, he killed, *yuqtalu*, he was killed, *uqtul*, kill! *tuqātilūna*, ye fought, or *wajaba*, it is necessary, *ujibu*, I made it necessary, *nastawjibu*, we considered it necessary for ourselves.

The decay and loss of inflection has been constant from the pre-Indo-Germanic period to the present day. The analytic type of language (see PHILOLOGY) has steadily encroached on the inflectional, until we have such relatively inflectionless languages as the English and the modern Persian. It has been estimated that a Greek verb can have as many as 249 different forms without counting its infinitives and participles, whereas for the Sanskrit it may reach the astounding number of 891 different forms. If we compare with these the very limited number of verb forms in modern English, we can obtain some idea of the tremendous loss of inflections that has marked its growth. It is still a moot question whether the growth of the analytic type at the expense of the inflectional marks an advance. Certain scholars, notably Jespersen in his *Progress in Language with Special Reference to English* (London, 1894), have answered in the affirmative, for in an inflectional form, as Lat. *amaveram*, I had loved, we have the attitude of the speaker, the person of the speaker, the time of the action, and the verbal force all combined, which may be more elements than are necessary in some instances for the speaker's immediate purpose. On the other hand, the inflectional languages are more compact than the analytic. A fair answer to this problem may be that the surrender of inflection to analysis marks a linguistic loss but a psychological gain. Such a conclusion carries with it the implication that, as psychological requirements ultimately condition all but the mechanical (phonetic) side of language, the final balance is in favor of the analytic type of speech.

Consult: Bréal, *Essai de Sémantique* (4th ed., Paris, 1913); Mauthner, *Beiträge zur einer Kritik der Sprache* (2d ed., Stuttgart, 1906–13); id., *Die Sprache* (ib., 1906); Paul, *Prinzipien der Sprachgeschichte* (4th ed., Halle, 1909); Brugmann, *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen*, vol. ii, part ii (Strassburg, 1913).

INFLECTION IN LIGHT. See DIFFRACTION AND DIFFRACTION GRATINGS.

INFLORES'CENCE (from Lat. *inflorescere*, to begin to flower, from *in*, in + *florescere*, to begin to flower, from *florere*, to flower, from *flos*, flower; connected with OIr. *bláth*, OHG. *bluoma*, Ger. *Blume*, Goth. *blōma*, Icel. *blōme*, flower, and with AS. *blōstm*, Eng. *blossom*). The manner in which flowers are arranged in a cluster; or sometimes simply a flower cluster. In many plants the flowers occur singly, either at the end of the stem or among the leaves; but when a definite region of the plant is set apart for flowers, it is called an inflorescence. The arrangement of flowers in such clusters is very diverse, and numerous technical terms are employed to designate the different kinds of inflorescence. All kinds, however, are usually reduced to two categories—the indeterminate, or *botryose*, and the determinate, or *cymose*.



INFLORESCENCE.

1, spicate raceme; 2, compound umbel; 3, panicle; 4, elongated cyme; 5, corymb.

In the botryose type no flower stands upon the end of the axis, which therefore may continue its growth indefinitely (hence an indeterminate inflorescence). As a consequence, the flower buds continue to appear at or near the growing tip of the axis, and since the older flowers are below, this method is called *acropetal* or *ascending*. There are numerous forms of the botryose type, conspicuous among which are the following: *Raceme*, in which each flower, upon its own stalk, stands upon an elongated axis, as in spring beauty (*Claytonia*) and shepherd's purse (*Capsella*). Such an inflorescence is elongated, open, and spraylike. *Panicle*, a modification of the raceme, in which the flower stalks, especially the lower ones, branch, bear a small cluster of flowers, and together produce a general cluster more or less pyramidal in outline, as in the spraylike inflorescence of many grasses (as redtop). *Thyrsus*, a modification of the panicle, in which the flowers are so congested as to form a compact pyramidal cluster, as in the lilac and a bunch of grapes. *Spike*, a modification of the raceme, in which the individual flowers have no stalks, but rest directly upon the elongated axis (sessile), as in the common plantain and many grasses (e.g., timothy). Sometimes these sessile flowers are so close together as to cover the axis completely, in other cases they are more or less scattered along it. A *spikelet* is literally a small spike, but the term is applied almost exclusively to the small spicate flower clusters which together make up the general spike or panicle of grasses. *Ament*, or *catkin*, practically the same as a spike or raceme, but with the subtending bracts so conspicuous as to conceal the flowers until pollination, as in the pussy willow, alder, birch, etc., which in consequence are often called amentaceous plants. *Spadix*, a modification of a spike, in which the axis becomes fleshy, as jack-in-the-pulpit (*Arisæma*) and calla. In this case the fleshy spike or spadix is more or less enveloped by a great ensheathing bract called the *spathe*, which is often conspicuously colored. In the calla it is waxy white and represents to most persons the "flower." This inflorescence is characteristic of the great family of Aroids. *Corymb*, in which the stalks of the lower flowers are elongated in such a way as to produce a more or less flat-topped cluster. In such a cluster the lower flowers are the outermost, and, as they bloom first, the order of blooming, while really ascending or acropetal as in the raceme, appears to be from the circumference towards the centre, or *centripetal*. Most of the so-called corymbs are cymes (see below). *Umbel*, in which the floral axis does not elongate. The flower stalks appear therefore to rise from the same point, like the braces of an umbrella. This also results in a flat-topped cluster, as in wild carrot, wild parsnip, etc. Since each flower stalk is usually subtended by a bract, in an umbel the bracts are thrown together in a rosette, which is called the *involucre*. Umbels very often become compound, i.e., each main stalk (ray) of the cluster bears another umbel, so that the general umbel is composed of a collection of small ones called *umbellets*, whose involucres are called *involucels*. This inflorescence is characteristic of the great family Umbelliferæ. *Head*, a modification of an umbel, in which the flowers are sessile (without stalks) and result in a compact, headlike cluster, as in sunflower, dandelion, etc. In this case also an involucre is a conspicuous feature, and in the great family Compositæ the whole head with its numerous flowers is commonly spoken of as a single flower.

In the *cymose* type of inflorescence the first flower appears at the end of the axis, which therefore ceases to elongate (hence a determinate inflorescence). As a consequence, the flower buds appear successively down the axis; hence this method is called *basipetal* or *descending*. There are several modifications of the cymose type, but the single term in most common use is *cyme*, which is a flat-topped cluster resembling a corymb. It may be distinguished easily, however, by the fact that the flowers begin to bloom in the centre (top) of the cluster, and the succession is towards the circumference, or *centrifugal*, as in elder and hydrangea. A *glomerule* is a cyme in which the flowers are so much crowded as to form a sort of head, as in some dogwoods. For bibliography, see references under BOTANY.

INFLUENCE LINES. See GRAPHIC STATICS.

IN'FLUEN'ZA (It., influence), EPIDEMIC INFLUENZA, or LA GRIPPE. An infectious disease due to a specific bacillus and characterized by great weakness and prostration, with mental depression, and generally by catarrh of the nasal and respiratory passages.

History. Authorities differ as to the first account of this disease as well as to the identity of epidemics occurring before 1580. A severe epidemic in 412 B.C., described by Hippocrates and Livius, is thought to have been influenza. Authentic epidemics of the disease have occurred frequently since 1173. In that year the disease spread over Italy, Germany, and England. The next epidemics occurred in 1239 and 1311, as far as available records show, though it is possible that the pestilence which devastated France in 1311 was of another nature. In 1323, 1327, 1387, and 1403 epidemics of *la grippe* certainly occurred, as well as in 1404, 1411, 1414, and 1427. The first pandemic of the disease reported appeared in 1510 and spread over all Europe, apparently rising in Africa. It was benign in character. In 1557 occurred a repetition of the experience, all Europe suffering, having been invaded by way of Asia, and spreading, some historians report, to America. The mortality from this epidemic was very large. In 1580 the second pandemic appeared, and it was characterized by special virulence. Epidemics followed in 1591, 1593, 1597, and 1626. In 1647 the influenza spread through the plantations of America and in the West Indies. Hubbard reports that there died in Barbados and St. Kitts 5000 or 6000 each. The years 1658, 1675, 1688, 1693, 1709, 1712, 1729, and 1732 were *grippe* years. In the last-named year the American colonies suffered, as also the West Indies, Mexico, and South America; Russia, Poland, Germany, Switzerland, Holland, England, Scotland, France, Spain, and Italy were attacked in about the order named. People upon vessels in the open sea were said to have been attacked. In 1737 and 1742–43 the dread disease reappeared. In accounts of the latter epidemic the terms "influenza" and "grippe" first appeared. In 1758, 1761, 1762, 1767, 1775, 1780, 1781–82, 1788–89, 1799–1800, 1802–03, the disease was reported in epidemic form, and from 1803 to 1830 it spread from country to country, disappearing and reappearing after short intervals. China is supposed to have suffered most in 1830–32, Upper Asia, Europe, and North Africa being invaded in 1833. From 1836 to 1848 it prevailed in various localities, as also from 1850 to 1889. In 1847–48 the influenza was pandemic, with a high mortality. The pandemic in which the present generation is most interested began in 1889, when the disease spread over the whole globe. Since that date the United States has hardly been free from influenza, for the epidemics of 1893–94 and 1905 must be viewed as recrudescences of the persisting epidemic, individual cases or small epidemics having been separately observed. The pandemic of 1889 originated in Central Asia. From Bokhara it was traced successively to Siberia, European Russia, Sweden, Denmark, France, Germany, Belgium, and England; Asia Minor, Italy, Turkey, and Greece being attacked simultaneously with Germany and England. Shortly thereafter it appeared in Tunis, later in Mexico, South America, and Australia. It invaded Boston at the same time London was attacked, and San Francisco contemporaneously with Buenos Aires. Human intercourse and especially commerce appear to be the determining factors in its dissemination. The mortality in later epidemics has been variously estimated at from 17 to 50 per cent.

Cause. The aërobe causing influenza is called *Pfeiffer's bacillus*. It was discovered in 1891 by

Pfeiffer, Kitasato, and Canon, working independently. It is a bacillus occurring singly, in pairs, or chains, or clumps, appearing as a straight rod with rounded ends, nonmotile, and not forming spores. It is best stained by a weak solution of carbol-fuchsin applied for at least 10 minutes. The bacillus grows best on glycerin-agar smeared with blood, at body temperature. The bacilli are found chiefly in the respiratory passages, mixed with other organisms, in the nasal mucus, or in the sputum from the bronchi, and even penetrating to the submucous stratum of the mucous membrane. They are occasionally found in the blood in small numbers. They are found in the secretion in grippal middle-ear inflammation and also in the exudate in cases of grippal meningitis. The chief symptoms of the disease are due to toxins resident in the bodies of the bacilli or produced by them as excretory matter, and absorbed by the victim from the respiratory tract. The bacillus has not been found in any other disease, but is always present in the secretions of the respiratory tract in true influenza. Experimental inoculation of monkeys has caused high fever, followed by death, no definite results being reached. But there is no evidence that any of the lower animals suffer from influenza under natural conditions.

Symptoms. The symptoms of a typical attack of influenza are headache with especially severe pain in the orbits and at the base of the occiput; fever, with a temperature of 102° or 103°, generally following an initial chill; great prostration and weakness with mental depression; pain in many of the joints and bones, and tenderness in the muscles; swelling of the mucous lining of the nasal passages with increased flow of mucus; cough, with expectoration of small masses of thick yellowish or greenish mucus, accompanied by tenderness in the region of the breast bone; rapid and generally weak pulse; buzzing noises in the ears; and slight tremor of the whole body. There is an inflammation of the throat, its mucous lining being congested and the palatal folds swollen and rigid. There may be sudden attacks of vertigo or of syncope, or of unconsciousness resembling that due to apoplexy. In some cases, in the place of severe catarrhal symptoms, an eruption, resembling an urticaria, appears on the body. In others the most severe symptoms are referable to the gastrointestinal tract; the tongue being coated, the breath foul, the abdomen very tender on pressure, vomiting occurring, and the action of the bowels being irregular. In still other cases the headache, backache, neuralgia (trigeminal, occipital, cervicobrachial, or intercostal), myalgia, insomnia, syncope, and vertigo are the most prominent symptoms. Influenza is peculiarly apt to attack the accessory nasal sinuses and the ears, empyema of these cavities and of the mastoid process of the temporal bone being a common complication. The predominance of sets of symptoms in certain classes of cases has led to the attempt by some physicians to divide influenza into respiratory, gastrointestinal, and nervous forms, of which the last has been fairly adopted. In all cases there is danger of pneumonia (q.v.). Both pleuræ and lungs are involved with surprising rapidity very early in some cases, with or without bronchial implication. The pneumonia is lobular in variety, disseminated in separate areas throughout the lungs, with irregular and atypical invasion. It resolves by lysis and not by crisis, and predictions of its termination are impossible. The grippe pneumonia is much more fatal than the ordinary lobar pneumonia. The only safe place for a patient with influenza is in bed, during the attack, lest myocarditis (q.v.) or pneumonia should suddenly appear, and the patient's life be actually jeopardized, and lest the effort to continue one's vocation in spite of undermined strength result in a protracted neurasthenia as a sequel to the attack.

Treatment. The treatment of epidemic influenza consists in rest in bed, as has been said, as soon as the prostration supervenes, or the temperature rises above the normal. Among drugs quinine occupies the front rank. It is of great value in every case, not in large doses and not necessarily prolonged. Other drugs of value, at different stages or in different types of the disorder, are antipyrin, phenacetin, salipyrin, salicylate of sodium, iodine, digitalis, benzol, carbolic acid, ipecacuanha, camphor, alcohol, and strychnine. Several of these remedies being powerful and dangerous drugs, they should not be indiscriminately used, or used at all without a physician's advice. A weak heart may be crippled by the unintelligent use of a depressant or an overstimulating drug.

Prophylaxis. The contagium of the disease is carried by the sputa and the nasal mucus, and precautionary measures should be employed, where possible, to limit the disease. *Grippe* patients in hotels, sanitariums, and schools should be isolated. Their table utensils and bed linen and body clothes should be disinfected with boiling water. Prevention should be secured of the deposition of secretions upon carpets or furniture. Gargles, nasal sprays, and mouth washes prevent infection by clearing out mucus that might form a nidus for the disease in a healthy mouth. Quinine internally is a good prophylactic. The bacillus has been found dead after two hours' exposure to sunlight or dry air, in nasal mucus. Infection of another may occur from the moisture in the breath of a patient who coughs out a spray of fine mucus into the atmosphere. Reinfection of a convalescing patient frequently occurs. Patients should therefore cough into a moist handkerchief; avoid kissing others; use separate utensils at table; sterilize these and all clothing of body and bed; spit into a cup containing water, this cup to be cleansed frequently with very hot water; or if in a school, hotel, sanitarium, etc., be isolated. Patients suffering with tuberculosis, bronchitis, pharyngitis, or nasal catarrh should avoid mingling with *grippe* patients.

Bibliography. Huxham, *Opera Physio-Medica* (Leipzig, 1874); Schweich, *Die Influenza* (Berlin, 1836); Wolff, *Die Influenza-Epidemie, 1889–92* (Stuttgart, 1892); Edson, *La grippe* (2d ed., New York, 1894); Tyson, *Practice of Medicine* (Philadelphia, 1913); Hopkirk, *Influenza* (New York, 1914). Lichtenstern's account in Hermann Nothnagel, *Handbuch* (Berlin, 1870), is very complete. See BACTERIA; EPIDEMIC.

INFLUENZA (in animals), HORSE DISTEMPER, EPIZOÖTY, PINK EYE, TYPHOID FEVER, or BILIOUS FEVER (Fr. *grippe*, Ger. *Pferdestaupe*). An acute febrile, contagious disease of the horse, ass, and mule that occurs frequently in stables in an enzoötic form, the primary cause of which has not been established. Two forms are distinguished: one, the catarrhal influenza, characterized by acute catarrh of the mucous membranes; the other, the pectoral influenza, characterized by severe inflammation of the lungs and pleura. The affection is characterized by stupor, alteration of the blood, great depression of the vital forces, and frequent inflammatory complications of the important vascular organs, especially of the lungs, intestines, brain, and laminæ of the feet. The animal becomes dull and indifferent to surroundings, has a rapidly developing fever, and stands with its head down. The eyes become puffed and secrete a watery discharge, and the mucous membranes of the eye and mouth become reddened or yellowish. Dropsical swellings may appear on the legs and undersurface of the abdomen. When the disease has run its course, which requires a period of six to ten days, the fever abates as rapidly as it began. Death may occur from extreme fever, failure of the heart's action, asphyxia following congestion of the lungs, etc., the disintegration of the red blood corpuscles. The most important complications of the disease are inflammatory processes in the lungs in about 50 per cent of the cases, in the brain, or laminar tissue of the feet. The majority of horses are susceptible to influenza, and it is fatal in many cases, even with the best treatment. One attack usually protects from future attacks, but not always. Since the red corpuscles are destroyed by the disease, bleeding should not be practiced except in strong subjects. It is important that the sick horse should be placed in a well-ventilated box stall, and that it consume a moderate quantity of nourishing food. The temperature may be reduced by injecting large quantities of cold water into the rectum. To reduce the temperature, antipyrin may be used with alcohol or strychnine. Quinine and salicyclic acid in dram doses will also lower the temperature. Mustard poultices, baths of alcohol, turpentine, and hot water are useful in relieving congestion of the lungs. Aconite has an almost specific action in congestion of the brain. Excellent results have been obtained during the last few years from the administration of salvarsan and neosalvarsan, but the high cost of these drugs has prevented a more general use. Consult: United States Department of Agriculture, *Special Report on Diseases of the Horse* (rev. ed., Washington); Hutyra and Marek, *Special Pathology and Therapeutics of the Diseases of Domestic Animals* (Am. ed. from 3d rev. Ger. ed., 2 vols., Chicago, 1912); E. W. Hoare, *System of Veterinary Medicine* (ib., 1913).

IN FORMA PAUPERIS. See Forma Pauperis, In.

INFORMA'TION (Lat. *informatio*, outline, representation, from *informare*, to sketch, to inform, from *in*, in + *forma*, shape). In English and American law, a summary method of instituting criminal proceedings at the instance of the public authorities and without the process of indictment (q.v.). The free use of this proceeding under the Tudor and Stuart kings and its abuse by the Court of Star Chamber constituted one of the grave abuses of the royal prerogative at which the revolutions of 1645 and 1688 were aimed. The process was greatly restricted by Act of Parliament in 1641 (16 Car. I, c. 10) and 1693 (4 and 5 Wm. and Mary, c. 18). In theory the right to institute criminal proceedings by information was always limited to the class of offenses known as misdemeanors, but the distinction between misdemeanors and felonies was too indefinite to make this a complete safeguard of the liberty of the subject. The Constitution of the United States (Amendments Art. V) restricts the use of informations to crimes which are not capital or of an infamous character by requiring an indictment by a grand jury in all such cases. In practice, at the present time, in England an information filed by the Attorney-General or Master of the Crown Office is resorted to only in cases of such misdemeanors as tend to disturb the peace or affect the administration of the government, as libels on judges, magistrates, or public officers, bribery at elections, etc. This information is usually called a criminal or an ex-officio information, and the defendant is put on his trial in the same way as under an indictment. In form and substance it is precisely like an indictment, differing from it only in the fact that it is presented upon the official oath of a duly authorized officer of the government and not upon presentment alone by a grand jury.

There are other informations, such as those called *quo warranto*, to test the validity of an election or appointment to a public office, etc. An information by the Attorney-General in chancery is a suit on behalf of the crown as to any misapplication of a public charity or on behalf of an idiot's or lunatic's property. The term is also commonly used to denote the written statement made on oath before a justice of the peace, or committing magistrate, previous to the issuing of a summons or complaint against a person charged either with a crime or an offense punishable summarily. There are also informations in the Court of Exchequer to recover penalties for the breach of the revenue laws. The term is not now used technically in Scotland, except in cases of difficulty, when the court of justiciary orders informations—i.e., written arguments.

In the United States courts actions for minor offenses, such as attempts to evade the revenue laws, etc., sometimes proceed upon information. In several of the States all misdemeanors, except misprision of treason (q.v.), may be prosecuted upon information, but in the case of felonies indictment is everywhere necessary. Information is also the form of proceeding employed in certain civil cases. By this process a person filling a civil office may be brought into court to show by what authority he assumes to exercise the functions thereof, with a view to his displacement in case it can be shown that his authority is insufficient and that the office belongs to another. If an unincorporated association assumes corporate powers, it may be ousted by this process, while a legal corporation may be thus arraigned for a violation of its charter or any infraction of law. See the bibliography under Criminal Law, and consult Stephen, *History of the Criminal Law of England* (London, 1883), and Sir William Blackstone, *Commentaries on the Laws of England* (4th ed., 2 vols., Chicago, 1899).

INFORM'ER. In English and American law, a person who brings a criminal accusation against another. This term is not technically applicable to the officer of the government who presents an information (q.v.) against an offender, but to the person on whose "relation" the proceeding is instituted. As at common law the prosecution of criminal offenses was generally left to private initiative, the informer played an important part in the enforcement of the criminal law. With the institution of a crown prosecutor in England and of prosecuting attorneys in the United States, the importance of the informer has gone. At common law the informer had no private interest in the proceedings instigated by him, but by statute in many classes of cases, especially in violations of the revenue laws, informers are given a right of action for a penalty imposed by the law. The term "informer" has thus come to be commonly employed to describe a person entitled to enforce such a claim or demand. In England, when the informer sues in such an action, it is called a penal or *qui tam* action; but, in general, the penalty is now recoverable before justices of the peace in a summary proceeding. In informations and suits in chancery, which require to proceed in the name of the Attorney-General, the informer is called a relator. In Scotland an informer is the party who sets the Lord Advocate in motion in criminal prosecutions; and the Lord Advocate is bound to give up the name of the informer, who is liable in case the prosecution instigated by him was without reasonable and probable cause. See Malicious Prosecution; and consult the authorities referred to under Criminal Law.

IN′FRALAPSA′RIAN (Lat. *infra*, below + *lapsus*, p.p. of *labi*, to slip), or Sublapsarian. In theology, one who holds that God permitted the fall of man without positively foreordaining it and makes His election of certain men to salvation and others to condemnation dependent upon His foreknowledge of the fall. According to this view God determined to create the world, to permit the fall, and to elect from the mass of fallen men some to eternal life, and leave the residue to suffer the just penalty of their sins. Election is thus made from those fallen by their own act, and this act is not necessitated by the divine power. Opposed to this view is that of the supralapsarians, who hold that the fall of Adam with all its evil consequences was predetermined from eternity, and that election to salvation or reprobation precedes the purpose to create and permit the fall and has no relation to it. God's purpose in creating and governing the universe is to manifest His attributes and glory; and He decrees the fall and creates some to be saved and others to be lost to exhibit His grace and justice. John Calvin wrote some passages which seem supralapsarian, but in his later work he is infralapsarian. The terms themselves did not come into use until after his time. The Creeds of the Synod of Dort (q.v.) and of the Westminster Assembly are infralapsarian. Many Calvinists were supralapsarians, e.g., Beza and Edwards, but this is rather hyper-Calvinistic than Calvinistic. The distinction is not confined to Calvinists. It is found also among the Roman Catholics. See Calvinism; Election; Fall, Doctrine of the; Foreknowledge and Foreordination.

INFRINGE′MENT (from Lat. *infringere*, to break, from *in*, in + *frangere*, to break; connected with Goth. *brikan*, OHG. *brehhan*, Ger. *brechen*, AS. *break*). In its most general sense, any violation of a law or invasion of a legal right which gives rise to a cause of action, in law or equity, in favor of the person injured thereby. The term is, however, more commonly employed in a technical sense to describe an unlawful appropriation of writings or works of art, inventions or trade-marks, when protected by copyrights, patents, or registration. The usual and proper remedy for an invasion of these rights is an action at law for the damages sustained, or a proceeding in equity for an injunction to restrain the infringement, thus securing an absolute enjoyment or monopoly of the inventions, writing, or trade-mark embraced in the work or device so protected.

Infringement of Patent. The manufacture, use, or sale of a thing, the subject matter of which is a patented invention, constitutes an infringement of the latter. To prove that an alleged new device incorporates the substance of an invention so protected, it is necessary to establish that the same result is accomplished, the same functions performed, and that the mode of operation is substantially the same. If these characteristics are present, a mere change in the form or in the arrangement of the parts of a patented article will not save the device thus constructed from being condemned as an infringement of the patentee's rights. See Patent.

Infringement of Trade-mark. This consists in the unlawful use of a mark or device which another has registered to provide a means of identification of his goods for the general public. Any device which is so similar to a registered trade-mark as to deceive or mislead the public constitutes an infringement thereof, even though it would not be difficult to distinguish the two when closely examined. The usual remedy for such infringement is by injunction. See Trade-Mark; Trade Name; Label. For the treatment of the subject of *Infringement of Copyrights*, see Copyright; Literary Property; and also Abridgment.

IN′FUNDIB′ULUM (Lat., funnel). A term used in anatomy to denote tubular passages that are somewhat funnel-shaped. The infundibulum of the brain is a hollow process continuous with the tuber cinereum and terminating in the pituitary body. The infundibulum of the nose, or infundibulum of the ethmoid bone, is a long cellular canal which passes from the frontal sinus through the anterior ethmoidal cells to the middle meatus of the nose. The infundibulum of the heart, or conus arteriosus, is that portion of the right ventricle of the heart which approaches the orifice of the pulmonary artery. The infundibula of the kidney are the three prolongations of the pelvis of the kidney, which are in turn subdivided into the calices.

INFU′SION (Lat. *infusio*, a pouring in, from *infundere*, to pour in, from *in*, in + *fundere*, to pour; connected with Goth. *giutan*, AS. *gêotan*, OHG. *giosan*, Ger. *giessen*, Gk. *χεῖν*, *chein*, Skt. *hu*, to pour), or Infusum. A term applied in pharmacy to an aqueous solution of a vegetable substance obtained without the aid of boiling. Such solutions are usually prepared by digesting in soft water (which may be either hot or cold, according to circumstances) the sliced or powdered substance in an earthenware vessel fitted with a cover. Cold water is preferable when the active principle is very volatile, or when it is expedient to avoid the solution of some ingredient in the vegetable which is soluble in hot but not in cold water. In most cases, however, hot water is employed. Infusions are preferred to decoctions when the active principle volatilizes at a boiling heat, as in the case of essential oils; or when ebullition readily induces some chemical change.

Infusions may also be prepared by percolation (q.v.), a process which is extensively employed in the preparation of tinctures. In all cases they should be prepared freshly for each day's consumption. Some pharmacists add less water than the stated amount in preparing an infusion by percolation, then add a considerable percentage of alcohol, and stock the preparation till demanded. When ordered, they add to this concentrated infusion enough water to equal the proportion in the fresh article. Four infusions are official in the United States Pharmacopœia, viz., cinchona, digitalis, *Prunus virginianæ*, and senna.

IN′FUSO′RIA (Neo-Lat. nom. pl., from Lat. *infusorium*, reservoir of a lamp, from *infusor*, pourer, from *infundere*, to pour in). The highest or most specialized class of Protozoa (q.v.). The name is of interest historically because originally applied to all those microörganisms which swarm in organic infusions, but it became gradually restricted to its present limits with the advancement of biological research. The name was first used about 1763, and the class Infusoria was removed from the Polypes by Lamarck in 1807. The name of Ehrenberg is, however, especially associated with the Infusoria, his epoch-marking work on them appearing in 1837. An excellent monograph of the group is that of W. S. Kent, *Manual of the Infusoria* (London, 1880–82). Consult S. T. Hickson, "The Infusoria," in E. R. Lankester, *Treatise on Zoölogy*, vol. i, part ii (ib., 1903), and M. M. Hartog, "Protozoa," in *Cambridge Natural History*, vol. i (ib., 1906).

INFUSO′RIAL EARTH. See Diatomaceous Earth.

INFU′SUM. See Infusion.

INGALLS, In′galz, James Monroe (1837–). An American soldier and authority on ballistics. He was born at Sutton, Vt., and served in the Civil War for a year and a half, at its close being promoted first lieutenant. Afterward he was engaged in reconstruction duty in the South until 1871. A year later he graduated from the Artillery School at Fortress Monroe, Va., where in 1882 he established the department of ballistics, and where he taught until 1898. He was promoted through the various grades to that of lieutenant colonel (1900) and was retired (1901); in 1904 he was made colonel retired. Besides contributing articles to Johnson's *Universal Cyclopædia*, he is author of *Exterior Ballistics* (1883, 1885, 1886); *Ballistic Machines* (1885); *Handbook of Problems in Exterior Ballistics* (1890, 1901); *Ballistic Tables* (1891, 1900); *Interior Ballistics* (1894; 3d ed., 1912); *Ballistics for the Instruction of Artillery Gunners* (1893).

INGALLS, John James (1833–1900). An American politician and publicist, born at Middleton, Mass. He graduated at Williams College in 1855, studied law, and in 1857 was admitted to the Massachusetts bar. In the following year, becoming interested in the "free State" movement in Kansas, he removed to Atchison in that State and began practice. He was a member of the State Constitutional Convention in 1859, was elected Secretary of the Territorial Council in 1860, and after the admission of Kansas to the Union in January, 1861, became Secretary of the new State Senate. The next year he was elected a member of the Senate, but failed to get the Republican nomination for Lieutenant Governor. From 1863 to 1865 he was editor of the Atchison *Champion*, and in 1873, after a sharp contest, was elected as a Republican to the United States Senate. In the Senate, to which he was reëlected in 1879 and 1885, he was a fluent and frequent speaker, brilliant at repartee, and was an excellent parliamentarian. He was a faithful champion of the various Republican administrations, and was president pro tempore of the Senate from 1887 until 1891, when he lost his seat as a result of the strength of the Democratic-Populist movement in his adopted State. He wrote much for newspapers and magazines on public topics and on farming. Consult Connelley, *Life of John J. Ingalls* (Kansas City, Mo., 1903).

INGALLS, Melville Ezra (1842–1914). An American railroad official, born at Harrison, Me., and educated at Bridgton Academy, at Bowdoin College, and at Harvard University (LL.B., 1863). He practiced law at Gray, Me., and later at Boston, and was a member of the Massachusetts Senate in 1867. He became president in 1870 and receiver in 1871 of the Indianapolis, Cincinnati, and Lafayette Railroad, which he reorganized upon a sound financial basis as the Cincinnati, Indianapolis, St. Louis, and Chicago. Later, by the consolidation of this road with others, he formed the Cleveland, Cincinnati, Chicago, and St. Louis—the "Big Four System"; of this he was chairman until his resignation in 1912, and he served also as president of the Chicago and Ohio Railway Company from 1888 to 1900. In 1905 he was president of the National Civic Federation.

INGALLS, Rufus (1820–93). An American soldier, born in Denmark, Me. He graduated at West Point in 1843 and served through the war with Mexico. In 1854–55 he accompanied Colonel Steptoe's expedition across the continent. During the Civil War he served with the Army of the Potomac, chiefly in the quartermaster-general's department, and was present at many of the most important battles, including Fredericksburg, Chancellorsville, Gettysburg, and the Wilderness. He was mustered out of the volunteer service on Sept. 1, 1866, with the brevet rank of major general both in the volunteer and in the regular army. In 1882 he was made brigadier general and quartermaster-general, and on July 1, 1883, was retired.

INGAUNI, In-ga′nê. An ancient tribe dwelling on the mountains and seacoast of what is now the western Riviera of Italy. They were active in the wars between the Romans and the Ligurians and were allies of the Carthaginians in the Second Punic War. After the battle with Æmilius Paulus (181 B.C.), in which they lost 15,000 men, very little was heard of them. Their chief town was Album Ingaunum, or Albingaunum (now Albenga, q.v.).

INGE, Inj, William Ralph (1860–). An English theologian, born in Crayke, Yorkshire, son of the provost of Worcester College, Oxford. He was educated at Eton and at King's College, Cambridge, of which he was fellow in 1886–88, being assistant master at Eton from 1884 to 1888. In 1889–1904 he was fellow and tutor of Hertford College, Oxford. He was repeatedly select preacher at Oxford and Cambridge, was Bampton lecturer in 1899 and Paddock lecturer (*Personal Idealism and Mysticism*, 1906) in New York, and was Lady Margaret professor of divinity at Oxford in 1907–11. In 1911 he was chosen dean of St. Paul's. Among his works are: *Society in Rome under the Cæsars* (1886); *Eton Latin Grammar* (1889; 3d ed., 1900), with Rawlins; *Christian Mysticism* (1899); *Faith and Knowledge* (1904); *Studies of English Mystics* (1906); *Truth and Falsehood in Religion* (1906); *Personal Idealism and Mysticism* (1907); *Faith* (1909); *Speculum Animæ* (1911); *The Church and the Age* (1912).

INGEBORG, ĭng′*e*-bôrg′, or **INGEBURGE**, ĭng′*e*-bo͞or′*ge* (c.1176–c.1237). A French queen, born in Denmark. She was the sister of Canute IV of Denmark and married Philip Augustus, King of France, in 1193. About three months after this marriage the King repudiated her and tried to obtain a separation. Pope Innocent III supported the Queen's rights and excommunicated Philip, who had married Agnes of Meran (1196), and he put France under an interdict. Philip promised to reinstate the Queen; but she was kept in prison, and it was not until 1213, when Philip Augustus needed her aid, that she regained her rights. Consult Davidson, *Philip II, August von Frankreich, und Ingeborg* (Stuttgart, 1888).

INGEGNERI, ān′gā-nyā′rē, Marco Antonio (c.1545–92). An Italian composer, born at Verona. He was a pupil of Vincenzo Ruffo and later the teacher of Monteverde (q.v.). Some time about 1575 he became maestro di cappella at the cathedral of Cremona, where he died. His work is of such excellence that for a long time his *Responsoria Hebdomadæ Sanctæ* was ascribed to Palestrina and even printed in Breitkopf and Härtel's complete edition of Palestrina's works, although as "opus dubium." The discovery by F. X. Haberl, in 1897, of a printed copy of this work, bearing the date 1588 and the name of Ingegneri as the composer, established the real authorship. Other works that have been preserved are two books of masses for five, six, and eight voices, a book of madrigals for six voices, five for five voices, and two for four voices.

INGELOW, ĭn′jė-lō, Jean (1820–97). An English poet and novelist, born in Boston, Lincolnshire. To the public she was unwilling to give the details of her life. Her first volume of verse, *A Rhyming Chronicle of Incidents and Feelings* (1850), published anonymously, excited considerable interest. Another volume, *Poems* (1863), which included "The High Tide on the Coast of Lincolnshire," possessed that kind of appeal which gave it immediate and instant success and sent it eventually into more than 20 editions. Subsequently she wrote *The Story of Doom, and Other Poems* (1867) and *Poems of the Old Days and the New* (1885). Her prose works include the novels *Off the Skelligs* (1872); *Fated to Be Free* (1873); *Sarah de Berenger* (1880); *Don John* (1881); *John Jerome* (1886); and also *Stories Told to a Child* (1865); *Mopsa the Fairy* (1869); *The Suspicious Jackdaw* (1871); *A Motto Changed* (1893); and others. Jean Ingelow is at her best in lyrics, especially those of a ballad nature. In her poetry there is the sweetness of her own character; but a something stilted and affected hurts her verse, as does also a certain tendency to improvisation. The charm of her poetry passed into some of her novels, notably *Off the Skelligs;* and *Mopsa* is a pretty tale of fairyland. Consult her *Poems* (Boston, 1892); selections from her poems with biographical and critical note, in *Warner's Library of Best Literature*, vols. xiv, xx (New York, 1896–99); and her collected *Poems* (London, 1898).

INGEMANN, ĭng′*e*-mån, Bernhard Severin (1789–1862). A Danish poet and novelist. He was born at Torkildstrup on the island of Falster, May 28, 1789, and was trained at the University of Copenhagen. His first *Poems* (1811) were of a dreamy and melancholy religiosity. *Procne* (1813) shows evidences of requited love; *The Black Knights* (1814) marks growing power, and the tragedies *Blanca* and *Masaniello* (1815) achieved a success of sentimental sensation. Ingemann received a government stipend, traveled, and on his return showed marked talent in narrative in *Fairy Tales and Stories* (1820). *The Magnetism in the Barber's Shop*, an unsuccessful comedy, closed his career as a playwright (1821). He now became lecturer on Danish language and literature at Sorö College, married, and wrote historic poems and novels voluminously, with a childlike faith that he was contributing to history (*Valdemar the Great and his Men*, 1824; *Valdemar the Victorious*, 1826; *Erik Menved's Childhood*, 1828; *King Erik and the Outlaws*, 1833; *Prince Otto of Denmark*, 1835; *Holger Danske*, 1837, and others). He wrote also a collection of very popular *Morning and Evening Hymns*. In 1846 he became director of Sorö College and retired in 1849. In the last decade of his life his work was almost wholly religious. His last book, *The Apple of Gold*, appeared in 1856. Ingemann's collected *Works* were published in 41 volumes (Copenhagen, 1843–65).

Bibliography. Ingemann's autobiography, edited by Galskjöt, *Min Levnedsbog* (Copenhagen, 1862); Heise, *Breve til og fra Ingemann* (ib., 1879); S. Grundtvig, *Grundtvig og Ingemann, Brevveksling, 1821–59* (ib., 1882); Nörregaard, *Ingemanns Digterstilling og Digterværd* (ib., 1886); Schwanenflügel, *Ingemanns Liv og Digtning* (ib., 1886); G. Brandes, *Essays* (1889).

INGENHOUSZ, ĭng′*e*n-hous′, Jan (1730–99). A Dutch scientist. He was born in Breda and studied and practiced medicine in his native country, but removed to London about 1765. Accident brought him an introduction to the Austrian Imperial family, whom he served professionally with such success that in 1768 he was made Aulic Councilor and body physician to Maria Theresa and to Joseph II. In 1779 he returned to London. He devoted much time and study to research in electricity and invented about 1760 the plate electrical machine which bears his name. Ingenhousz wrote several scientific treatises and essays, such as *Experiments on Vegetables, Discovering their Great Power of Purifying the Common Air in Sunshine, but Injuring it in the Shade or at Night* (1779); *Anfangsgründe der Electricität* (1781); and *Essay on the Food of Plants and the Renovation of Souls* (1796). A number of his papers were published in two volumes in Paris in 1785–89 under the title *Nouvelles expériences et observations sur divers objets de physique.*

INGERMANLAND, ĭng′ẽr-män′länt, or **INGRIA**, ĭŋ′grĭ-ȧ. The old name for a region in northwest Russia, constituting part of the Government of St. Petersburg. It belonged originally to Novgorod, and from 1617 to 1702 it was held by the Swedes, who lost it again to Russia in the wars of Peter the Great.

INGERSOLL, ĭŋ′gẽr-sŏl. A town in Oxford Co., Ontario, Canada, on the Thames River, 19 miles northeast of London, on the Grand Trunk and the Canadian Pacific railroads (Map: Ontario, D 7). It is a great exporting point and has manufactures of machinery, woolen goods, agricultural implements, furniture, tools, flour, knitted goods, cheese, fertilizers, pork-packing products, hearses, fruit packages, pianos, baskets. Pop., 1901, 4573; 1911, 4763.

INGERSOLL, Charles Jared (1782–1862). An American lawyer, writer, and politician, the son of Jared Ingersoll (1750–1822), a framer of the Constitution. He was born in Philadelphia, entered the College of New Jersey, where he remained three years, then studied law, traveled in Europe, and was for a time attached to the United States embassy in Paris. In 1801 he wrote the tragedy *Edwy and Elgiva*, which was produced at the New Theatre in Philadelphia, and in 1808 he published a strong political pamphlet in defense of the Republican policy of Thomas Jefferson. Three years later appeared his *Inchiquin the Jesuit's Letters on American Literature and Politics*. He was elected to Congress in 1812, was for 14 years United States district attorney for Pennsylvania, and again served in Congress from 1839 to 1849. His most ambitious work was *Historical Sketch of the Second War between the United States of America and Great Britain* (4 vols., 1845–52), which deals with the events of 1812–13. Consult W. M. Meigs, *Life of Charles J. Ingersoll* (Philadelphia, 1898).

INGERSOLL, Charles Roberts (1821–1903). An American politician and public official, son of Ralph Isaacs Ingersoll. He was born in New Haven, Conn., graduated at Yale in 1840 and at the Yale Law School in 1844, and, after several terms in the Connecticut Legislature, was Governor of the State from 1873 to 1877. He was a Democratic elector in 1876.

INGERSOLL, Ernest (1852–). An American naturalist, born at Monroe, Mich. He studied for a time at Oberlin College and afterward in the Museum of Comparative Zoölogy at Harvard, where he was a pupil of Louis Agassiz. He went West as naturalist in the Hayden survey (1874 and 1877) and did much work with the United States Fish Commission. He became widely known as a writer of special magazine articles and of numerous guide books and as a popular lecturer upon scientific subjects. In 1901 he was lecturer on zoölogy at the University of Chicago. His books include: *Nests and Eggs of North American Birds*, parts i–vii (1880–81); *Oyster Industries of the United States* (1881); *Knocking 'round the Rockies* (1883); *The Ice Queen* (1884), and other juvenile novels; *The Crest of the Continent* (1885); *Down East Latch Strings* (1887); *Wild Neighbors* (1897); *The Book of the Ocean* (1898); *Nature's Calendar* (1900); *Wild Life of Orchard and Field* (1902); *Life of Animals: The Mammals* (1906; 2d ed., 1907); *Eight Secrets* (1906); *The Wit of the Wild* (1906); *Animal Competitors* (1911).

INGERSOLL, Jared (1722–81). An American politician, born in Milford, Conn., and educated at Yale College. In 1765, after the passage of the Stamp Act, he accepted, under Franklin's advice, the appointment as stamp agent for Connecticut, but soon, after undergoing the insults and personal abuse that fell to the lot of all Colonial stamp agents, was forced by the people to resign. In 1766 he published a pamphlet entitled *The Stamp Act*. He became an admiralty judge in 1770.

INGERSOLL, Jared (1750–1822). An American jurist, born in New Haven, Conn., son of Jared Ingersoll (q.v.). He graduated at Yale in 1766 and later went to London, where he studied law. His sympathies were with the patriot party in America, however, and at about the time of the signing of the Declaration of Independence he went to Paris, where he became intimate with Franklin, Izard, and other Americans then in the French capital. In the autumn of 1778 he returned to America and settled in Philadelphia, where he soon became well known as a lawyer. In 1780 he was elected to Congress and in 1787 was chosen a member of the Constitutional Convention. He was the first Attorney-General of Pennsylvania, was the Federal candidate for Vice President of the United States in 1812, and at the time of his death was presiding judge of the district court of Philadelphia County.

INGERSOLL, Joseph Reed (1786–1868). An American politician, born in Philadelphia. He was the son of Jared Ingersoll (q.v.), a framer of the Constitution; the grandson of Jared Ingersoll (q.v.), and brother of Charles Jared Ingersoll (q.v.). He graduated at Princeton in 1804 and after studying law began to practice in Philadelphia. He was a member of Congress from 1835 until 1837, and again from December, 1841, until 1849. In 1852 he was appointed Minister to England by President Fillmore, but returned to America the next year. His most important publication is a pamphlet entitled *Secession a Folly and a Crime*, which appeared at the outbreak of the Civil War. He also wrote a *Memoir of Samuel Breck* (1863) and translated Roccus's *De Navibus et Naulo* and *De Assecuratione* (1809).

INGERSOLL, Leonard Rose (1880–). An American physicist, born in New York City. He graduated from Colorado College (B.S., 1902) and from the University of Wisconsin (Ph.D., 1905), where he was instructor in physics (1905–08), assistant professor (1908–10), and associate professor after 1910. He participated in the Smithsonian expeditions to Mount Wilson, Cal., in 1905, 1906, and 1909. He published *An Introduction to the Mathematical Theory of Heat Conduction* (1913).

INGERSOLL, Ralph Isaacs (1788–1872). An American lawyer and statesman. He was born in New Haven, Conn., graduated at Yale in 1808, was a prominent member of the bar, and a leading Democratic speaker in the Connecticut Legislature (1819–25), earning the name of "Young Hotspur" from his political opponents. Ingersoll was a Representative in Congress (1825–33), then Connecticut State attorney, and from 1846 to 1848 United States Minister to Russia.

INGERSOLL, Robert Green (1833–99). An American lawyer and infidel writer and lecturer. He was born at Dresden, N. Y., Aug. 11, 1833, the youngest of the five children of a Congregational minister of liberal views. The family removed to Illinois in 1845, and there Robert studied law, was admitted to the bar, and entered politics as a Democrat. In 1857 he made his residence in Peoria, where he soon became recognized as an able lawyer, chiefly employed in railroad litigation. In 1860 he was nominated for Congress, but was defeated. In 1862 he went to the war as colonel of the Eleventh Illinois Cavalry and was taken prisoner, but exchanged. He returned to citizenship a Republican in politics and was appointed Attorney-General of Illinois in 1868. In 1876, at the Republican Presidential Convention at Cincinnati, he delivered a fervid and vigorous speech in favor of the candidacy of James G. Blaine, which won for him a national reputation, and from this time he was recognized as one of the foremost orators of the country. He soon after entered the lecture field, where the matter as well as the manner of his discourse excited public attention. He became a pronounced opponent to Christianity and, adopting religious topics as his subjects, attacked the popular Christian beliefs with all the force of which he was capable and with the advantage of splendid rhetorical powers. Colonel Ingersoll was counsel for large corporations. His published works include: *The Gods, and Other Lectures* (1876); *Some Mistakes of Moses* (1879); *Great Speeches* (1887); *Lectures Complete* (1883); *Prose Poems and Selections* (1884). His complete works were published in New York, 1900, 12 volumes. Consult the biographical sketch by Hanford (Chicago, 1899); E. C. Smith, *Life and Reminiscences of Colonel Robert G. Ingersoll* (New York, 1906); H. E. Kittredge, *Ingersoll: A Biographical Appreciation* (ib., 1911).

INGERSOLL, Royal Rodney (1847–). An American naval officer, born at Niles, Mich. He graduated from the United States Naval Academy in 1868, served in various parts of the world, and became captain in 1903 and rear admiral in 1908. He commanded the *Supply* during the Spanish-American War and the *Maryland* in 1905, was chief of staff of the Atlantic fleet during its voyage from Hampton Roads to the Pacific, and later served on the General Board of the Navy. He was retired in 1909. He is author of *Text-Book of Ordnance and Gunnery* (1887; 4th ed., 1899); *Exterior Ballistics* (1891); *Elastic Strength of Guns* (1891).

INGHAM, ĭng′*am*, Benjamin (1712–72). An English evangelist. He was born at Ossett and graduated from Queen's College, Oxford, in 1734. He had, in 1733, become associated with the Wesleys and after his ordination, in 1735, accompanied them to Georgia. About 1737 he became a Moravian, broke with the Wesleyans, and founded in Yorkshire many Moravian congregations, which followed him when he separated from that sect. They were known as Inghamites until their head joined Sandeman, about 1760, when they broke up.

INGHAM, Charles Cromwell (1796–1863). An American portrait and figure painter. He was born in Dublin, Ireland, and studied at the Dublin Institution under William Cunning. He came to America in 1817 and settled in New York, where he became celebrated as a portrait painter of women and children and as a miniature painter. He is interesting as having been identified with the first efforts to promote painting in this country. He was one of the original members, in 1826, of the National Academy of Design, of which he was vice president from 1845 to 1850, and was one of the founders of the Sketch Club. Among his figure pieces are: "Death of Cleopatra," "Day Dream," the "White Plume." His "Flower Girl" in the Metropolitan Museum is illustrated in Isham's *American Painting*. Among his portraits of prominent men are those of De Witt Clinton, Lafayette, and Gulian C. Verplanck. His colors were pure and brilliant, and his details were finished with painstaking accuracy, but his work lacks strength and is inferior in composition.

INGHAM, Col. Frederic. The nom de plume under which Edward Everett Hale wrote *The Ingham Papers* (1869).

INGHAM, Samuel Delucenna (1779–1860). An American statesman and politician, born in Pennsylvania. Very little is known of his early life except that he had charge of a paper mill in New Jersey for a number of years. After serving in the Pennsylvania Legislature he was elected to Congress in 1813. He was a member of the House of Representatives till 1818 and again from 1822 to 1829. On March 6, 1829, he was appointed Secretary of the Treasury by President Jackson, a position which he held till Aug. 1, 1831. When the Portsmouth branch of the United States Bank was complained of as being conducted with partiality towards opponents of the administration, it was Ingham's correspondence with Nicholas Biddle, president of the bank, that resulted in its declaration of its intention to pursue an independent course and in the consequent struggle with Jackson.

INGHAMITES, ĭng′*am*-īts. A sect founded by Benjamin Ingham (1712–72), who, after visiting the German Moravians with John Wesley, endeavored to unite the chief features of the Moravians and the Methodists in a new body, called, after him, Inghamites. The organization had at one time a large number of adherents in England, but Ingham and the greater part of his followers at last went over to the Sandemanians, and the sect disappeared.

INGHIRAMI, êṉ′gê-rä′mê. An Italian noble family of Volterra.—Its earliest member of importance was the humanist, Tommaso (1470–1516), called Fedra, because of his success as Phædra in a presentation of Seneca's *Hippolytus* (or *Phædra*), but best known for his Latin orations, such as *Oratio in funere card. Ludovici de Podocataro; Oratio in laudem Ferdinandi Hispaniæ regis; Oratio in laudem Petri de Vicentia, episcopi Cesenatensis*, published by Galletti in Amaduzzi's *Aneddoti letterarii di Roma*, and for a few critical works in manuscript form on Horace and Plautus.—Francesco (1772–1846), an archæologist of the same family, was also born at Volterra. Originally intended for the navy, he early showed such love for antiquities that he soon abandoned the career of arms. He studied under Lanzi and was a friend of the famous Hackert. Director of the Volterra Public Library, which was rich in Etruscan relics, he devoted himself especially to Etruscan archæology, and when in 1811 the Marucellian collection was transferred to Florence, he moved to Fiesole, where he founded his *Poliografia Fiesolana* and later published his great work, *I Monumenti Etruschi* (1820–27). Some of his other works are: *Galleria omerica* (1827–38), *Pittura dei vasi fittili* (1831–37), and the incomplete *Storia della Toscana* (1841–45). He also helped in the publication of the *Museo Etrusco-Chiusino* (Florence, 1833).—Father Giovanni (1779–1851), brother of Francesco, a famous astronomer and mathematician, and greatly revered as a priest, was professor of astronomy and mathematics in the Ximenian Institute, director of the Florence Observatory, and member of the most celebrated academies of the world. His fame rests especially on the very simple method used by him in the compilation of his *Effemeridi di occultazione delle piccole stelle sotto la luna* from 1809 to 1830. He also wrote: *Principii idro-meccanici*, *La statica degli edifizii* (1803–05); *Tavole astronomiche universali portatili* (1811); *Effemeridi di Venere e Giove ad uso dei naviganti pel meridiano di Parigi* (1821–24); *Carta topografica e geometrica della Toscana* (1830); and other minor works and articles.

INGLE, ĭng′'l, Richard. An English seaman of the seventeenth century. He was engaged in the Maryland tobacco trade at the time of the Civil War in England and, taking the side of Parliament, drove Gov. Leonard Calvert out of the province in February, 1645. In December, 1646, Calvert returned at the head of a force of hired soldiers and regained control of the government. During his brief period of power Ingle behaved in a most lawless manner and on his return to England was called upon to answer charges preferred against him. He met this attack by presenting a petition to Parliament in which he said that his behavior had been dictated by conscience, and that he had plundered only "papists and malignants." He was especially exempted from the pardon extended to the other rebels by the restored proprietary government and last appears in history on Nov. 14, 1653, when he endeavored to secure a share in some prize money. Consult Ingle, *Capt. Richard Ingle, the Maryland Pirate and Rebel, 1642–53* (Maryland Historical Society Fund Publications, No. 19, Baltimore, 1884).

INGLEBY, ĭŋ′g'l-bĭ, Clement Mansfield (1823–86). A Shakespearean critic, son of a solicitor, born at Edgbaston, near Birmingham, England, Oct. 29, 1823. He graduated from Trinity College, Cambridge (B.A. 1847; M.A. 1850), and was received into partnership with his father, but he gave up law and settled near London (1859), and died Sept. 26, 1886. Ingleby wrote for the magazines and published several books on scientific and metaphysical topics. He is, however, best known for his studies on Shakespeare, of which the most notable are: *A Complete View of the Shakespeare Controversy* (1861), a full exposure of J. P. Collier's fabrications; *Shakespeare Hermeneutics* (1875), textual criticism; *Centurie of Prayse* (1875; enlarged, 1879, and entitled *Shakespeare Allusion Book* and edited and revised by J. J. Munroe, 2 vols., New York, 1909), allusions to Shakespeare between 1591 and 1693; and *Shakespeare: The Man and the Book* (two parts, 1877, 1881).

INGLEFIELD, ĭŋ′g'l-fēld, Sir Edward Augustus (1820–94). An English admiral and Arctic explorer, son of Rear Admiral Samuel Hood Inglefield (1783–1848). Born at Cheltenham and educated at the Royal Naval College at Portsmouth, he went to sea when he was 12. He is known principally through his summer search for Sir John Franklin, in the *Isabel*, in 1852, when he broke through the "continuous land" of Smith Sound reported by the British Arctic expedition of 1818. (See Ross, Sir John.) All things considered, it was the most successful of modern summer voyages in the Arctic. He discovered the West Greenland Channel leading to the Polar Ocean, and on August 27 made the highest latitude to date in the Western Hemisphere, 78° 28′ N. In 1853 he went to the relief of Sir Edward Belcher and on his return was the first to announce the discovery by McClure of the northwest passage. He was second in command of the Mediterranean fleet in 1872–75, was knighted in 1877, and was promoted to the rank of admiral in 1879. Inglefield was the inventor of the hydraulic steering gear, a painter of marine subjects, and author of *A Summer Search for Sir John Franklin* (1853). Consult *Blue Books, Arctic Expeditions* (London, Dec. 20, 1852, and January, 1855).

INGLIS, ĭŋ′glĭs, Charles (1734–1816). An Anglican bishop of Nova Scotia, born in New York. After teaching school a few years he became a clergyman, and was appointed a missionary at Dover, Del. In 1765 he became assistant minister of Trinity Church in New York City. He was prominent as a controversialist and replied trenchantly to Thomas Paine's *Common Sense*. During the War of Independence he was a sturdy Loyalist and refused to obey Washington's command to omit from his church service the prayer for the King and royal family. He retired temporarily to Flushing, Long Island, after the Declaration of Independence, but returned to New York City after Washington's defeat and in 1777 became rector of Trinity Church. When the British evacuated New York City in 1783, he joined the United Empire Loyalist emigration and went to Halifax. In 1787 he was consecrated at Lambeth, London, as the first Bishop of Nova Scotia, with jurisdiction over the other British North American provinces, and was the first colonial bishop of the Church of England. Dr. Inglis was honored with academic distinctions by King's College (now Columbia University) and in 1770 became one of the governors of the college.

INGLIS, Henry David (1795–1835). An English author, better known by his pen name, Derwent Conway, born in Edinburgh. His books include: *Tales of the Ardennes* (1825); *Narrative of a Journey through Norway, Part of Sweden, and the Islands and States of Denmark* (1826); *A Tour through Switzerland and the South of France and the Pyrenees* (1830–31); *Spain in 1830* (1831); *The Tyrol with a Glance at Bavaria* (1833); *The New Gil Blas, or Pedro of Pennaflor* (1832), less successful than his travels; *Ireland in 1834* (1834; 5th ed., 1838); and *Rambles in the Footsteps of Don Quixote* (1837), illustrated by Cruikshank. He also edited the *British Critic*, a Jersey newspaper, for two years (1832–34).

INGLIS, John, Lord Glencorse (1810–91). A Scottish jurist, born at Edinburgh. He was educated at Glasgow University and at Balliol College, Oxford (B.A., 1834), entered the Faculty of Advocates in his native city in 1835, and became dean of the same in 1852. He was a conservative supporter of Lord Derby, who made him Solicitor-General and then Lord Advocate of Scotland in 1852, Lord Justice Clerk, and a president of the Court of Session in 1858, and a member of the Privy Council in 1859. In 1867, as Lord Glencorse, he became Lord Justice General of Scotland and Lord President of the Court of Session. He was also prominent in educational matters, was made lord rector of King's College, Aberdeen, in 1857, and of Glasgow University in 1865, and was chancellor of Edinburgh University (1869).

INGLIS, Sir John Eardley Wilmot (1814–62). A British soldier, born in Nova Scotia. He entered the army as ensign in 1833, took part in the suppression of the rebellion in Lower Canada in 1837 and also in the Punjab campaign of 1848–49. It was as one of the defenders of Lucknow at the outbreak of the Indian Mutiny in 1857 that his most notable service was rendered. His regiment had taken refuge in Lucknow on July 1 of that year, and the city was besieged by the enemy in overwhelming numbers. When his superior officer, Sir Henry Lawrence, was wounded, Inglis took command and held out against the Sepoys until the relief of the city by Sir Henry Havelock. For this he was promoted to be major general. In 1860 he was appointed to the military command of the Ionian Islands, which at that time were in the possession of Great Britain.

INGLIS, Sir William (1764–1835). A British soldier in the Peninsular War. At the age of 15 he entered the army as ensign and in 1781 went with his regiment to America, where he remained for 10 years. In 1793 he returned to England. He took part in the campaign in Flanders and three years afterward served with distinction at the capture of St. Lucia. As commander of the First Battalion of the Fifty-seventh Regiment, he went with it to the Peninsula in 1809, where he participated in the battles of Busaco and Albuera. At Albuera he commanded the Fifty-seventh, which behaved with the utmost gallantry and suffered the loss of more than three-fourths of its number. Inglis was severely wounded, but afterward fought in several other engagements, including that at Ortez, in French territory, in 1814. After the war he was made a lieutenant general and was knighted.

INGOLDSBY, Iŋ′gôlz-bĭ, Sir Richard (?–1685). A British soldier, born in Buckinghamshire. As a kinsman of Oliver Cromwell, he naturally espoused the Parliamentary cause at the beginning of the Civil War. In 1645 he commanded a regiment which took part in several actions and garrisoned Oxford. At that time he apparently sympathized with the radical faction, which was bent upon inflicting the extreme penalty upon Charles I. He was a member of the court which tried the King, and his signature was affixed to the death warrant. After Oliver Cromwell's death he at first heartily supported Richard Cromwell, but after the latter's short and weak protectorate was ended, Ingoldsby was quite willing to make terms with Charles II and, having loudly asserted his unwilling participation in the trial and execution of the King, was exempted from the punishment suffered by the other regicides. During the interval in which General Monk was dictator he arrested General Lambert and dispersed his soldiers. Charles II conferred knighthood upon him. Ingoldsby was a member of Parliament during part of Cromwell's régime, sat in the Protector's House of Lords, and was also member for Aylesbury during most of the reign of Charles II.

INGOLDSBY LEGENDS. A well-known collection of legends, written by the Rev. Richard Harris Barham, under the pseudonym of Thomas Ingoldsby, originally published in *Bentley's Miscellany* and republished in three series from 1840 to 1852.

INGOLSTADT, Iŋ′gôl-shtät. An ancient fortified town of Bavaria, situated on the left bank of the Danube, 46 miles by rail from Ratisbon (Map: Germany, D 4). Its most noteworthy buildings are the fifteenth-century Frauenkirche, the old castle, and the old university buildings. The Jesuit University of Ingoldstadt was founded in 1472 by Duke Ludwig the Rich and by the end of the sixteenth century had about 4000 students. It was transferred in 1800 to Landshut and in 1826 to Munich. The town has a notable town hall, a theatre, a Franciscan cloister, and a fifteenth-century church containing the tomb of Dr. Eck, who opposed Luther. Ingoldstadt contains a number of establishments for the manufacturing of ammunition, weapons, and armor, and a school of military engineering. Soap, brushes, and beer are made. Pop., 1900, 22,207; 1910, 23,745, mostly Roman Catholics. Ingoldstadt existed as early as the ninth century. It received municipal rights at the beginning of the fourteenth century and was fortified in the first half of the sixteenth century. The town was besieged by Gustavus Adolphus in 1632, and its fortifications were destroyed by the French after a three months' siege in 1800. They were rebuilt during the first half of the nineteenth century.

IN′GOMAR THE BARBA′RIAN. A play by Maria Anne Lovell (1851), adapted from the German *Der Sohn der Wildnis* of Friedrich Halm.

IN′GOT. See Iron and Steel, Metallurgy of.

INGRAHAM, Iŋ′gra-hăm, Duncan Nathaniel (1802–91). An American naval officer, born in Charleston, S. C., the son of a Nathaniel Ingraham who served under John Paul Jones in the *Bon Homme Richard*. In 1812 he was appointed a midshipman in the United States navy and served through the second war with Great Britain. In 1825 he became a lieutenant and in 1841 a commander. He was one of the officers in Commodore David Porter's expedition against the Caribbean pirates and during the Mexican War served in the blockading fleet of Vera Cruz and was present at the capture of Tampico. Soon after the close of the war he was placed in command of the *St. Louis* on the Mediterranean station. His firm stand against the attempt made by Austria to seize Martin Koszta, who had participated in the Hungarian revolution of 1848 and had taken steps towards becoming a citizen of the United States, was supported by the United States and aroused great popular enthusiasm. (See Koszta Affair.) In 1855 he was commissioned captain, but at the outbreak of the Civil War he resigned from the service and became chief of the Bureau of Ordnance, Construction, and Repair of the Confederate Navy, in which he rose to the rank of commodore.

INGRAHAM, Joseph Holt (1809–60). An American novelist, born at Portland, Me. He went to sea when he was a boy, served in South American revolutions, and after graduation at Bowdoin in 1832 became a teacher in Natchez, Miss. His *The Southwest by a Yankee* (1836) was a great success, and was quickly followed by sensational volumes like *Lafitte; Burton, or the Sieges; Captain Kyd; The American Lounger* (1839); *The Hunchback and the Roué* (1843). In 1855 he took orders in the Episcopal Church and settled at Holly Springs, Miss., where he wrote his popular biblical series, including *The Prince of the House of David* (1855), *The Pillar of Fire* (1859), and *The Throne of David* (1860).

INGRAILED. See Engrailed.

INGRAM, In′gram, Arthur Foley Winnington (1858–). An Anglican bishop, born in Worcestershire, the grandson of Bishop Pepys of Worcester. He was educated at Marlborough College and at Keble College, Oxford, was a private tutor for three years (1881–84), and from 1885 to 1889 was private chaplain to the Bishop of Lichfield. In 1889 he became head of Oxford House, Bethnal Green, in 1896 rural dean of Spitalfields, in 1897 canon of St. Paul's and Bishop of Stepney, and in 1901 Bishop of London and dean of the chapels royal. He visited America in 1907. He wrote: *Old Testament Difficulties* (1892); *New Testament Difficulties* (1893); *Church Difficulties* (1896); *The Men who Crucify Christ* (1896); *Work in Great Cities* (1896); *Christ and His Friends* (1897); *Banners of the Christian Faith* (1899).

INGRAM, John Kells (1823–1907). An English economist and Positivist, born in Donegal, Ireland, and educated at Trinity College, Dublin. He was fellow there (1846), professor of oratory and English literature (1852), regius professor of Greek (1866), librarian (1879), and finally vice provost. He wrote: *A History of Political Economy* (reprinted, 1888, from the *Encyclopædia Britannica*); *On the Present Position and Prospects of Political Economy* (1878); *Outlines of the History of Religion,* in which work he declares himself a Positivist; *History of Slavery and Serfdom* (in *Encyclopædia Britannica,* 1888; published separately, 1895); *Sonnets and Other Poems* (1900); *Passages from the Letters of Augustus Comte* (1901); *Practical Morals* (1904); and edited *The Imitation of Christ,* from the manuscripts of the first English translation at Dublin and Cambridge (1892).

INGRASSIA, ĭn'grȧs-sē'ȧ, or **INGRASSIAS,** Giovanni Filippo (1510–80). A Sicilian anatomist, born at Palermo. The plague at Palermo in 1575 was checked largely by his methods and through his work. He made discoveries of great importance in anatomy and described them in his *In Galeni Librum de Ossibus Doctissima et Expertissima Commentaria.* He published several other interesting works.

INGRES, ăɴ'gr', Jean Auguste Dominique (1780–1867). A French historical and portrait painter, a leader of the Classicists. He was born at Montauban, Aug. 29, 1780, the son of a sculptor. He soon became the most important pupil of David, whose school he entered in 1796. In 1801 he received the Prix de Rome with the picture "Achilles Receiving the Messenger of Agamemnon," now in the Ecole des Beaux-Arts; but, owing to the state of the national finances, he was compelled to remain at Paris. He occupied himself with drawings, portraits, and mythological subjects until 1806, when he was sent to Rome. There he learned to know the works of Raphael, who exercised a dominating influence upon him. He also studied the antique fresco and vase painting, and these new influences brought him into conflict with the strict Classicists. While he continued to execute large historical pictures, he was compelled to earn his living by drawing those admirable crayon portraits—300 in number—which are perhaps the most extraordinary of his works. In 1820 he migrated to Florence, laboring under the same difficulties until, in 1824, the brilliant success of his "Vow of Louis XIII" (now in Montauban Cathedral) caused him to return to Paris.

He soon became the head of a large school and the acknowledged leader of the Classicists, hard pressed by the Romanticists, under the leadership of Delacroix. In 1829 he completed his "Apotheosis of Homer," a decoration of one of the ceilings of the Louvre, which is considered his finest epic painting. Weary of the hostile criticism which this painting provoked, he gladly became director of the French Academy at Rome in 1834, remaining there until 1841. During his second stay at Rome he painted two of his most admirable works, "Stratonice" and "Cherubini Inspired by the Muse" (Louvre), which were received with the highest praise. On his return to Paris, in 1841, he was made Officer of the Legion of Honor, Commander in 1845, and Grand Officer in 1855; he was named Senator on May 25, 1862; and he was soon after appointed a member of the Imperial Council of Public Instruction. At the Paris Exhibition of 1855 a room was set apart for his pictures, and one of two grand medals of honor was awarded to him, Delacroix getting the other. "La source," sent to the London Exhibition of 1862 and now in the Louvre, showed powers unimpaired by age. He died in Paris, Jan. 17, 1867.

Ingres's greatest strength lay in his drawing. *Le dessin, c'est la probité de l'art,* was his motto. His consummate skill is very evident in his admirable crayon studies and drawings, of which the Montauban Museum contains the most valuable collection, left by the painter to his native town. To him more than to any other the French school owes that excellency of draftsmanship for which it is famous. His studies also show an incredible perseverance and sincerity of purpose. These qualities, however, were attained at the expense of color, which, when not almost monochrome, was coarse and hard. His works also show lack of originality. The figures, even of his best paintings, may be traced to models in works of Raphael, Michelangelo, or Greek vase painting.

Among the most important historical paintings of his first Roman period are: "Œdipus and the Sphinx" (1810), in the Louvre; "Jupiter and Thetis" (1811), Aix Museum; the "Sleep of Ossian" (1811) and "Romulus Conquering Acron" (1812), frescoes for Napoleon's palace on the Monte Cavallo; the "Odalisque" (1814), Louvre; "Virgil Reading the *Æneid* to Augustus"; "Pedro of Toledo Kissing the Sword of Henry IV" (1814); "Raphael and the Fornarina" (1814); "Aretino and the Envoy of Charles V" (1816); "Roger and Angelica" (1819) and "Christ Delivering the Keys to St. Peter" (1820), both in the Louvre. His later works include: "Martyrdom of St. Symphorian" (1834), Autun Cathedral; "Madonna with the Host," St. Petersburg; "Christ among the Doctors" (1842); "Birth of Venus" (1848); "Aretino Visiting Tintoretto" (1848).

Ingres is, perhaps, greatest in portraiture, where he stands in closest contact with nature. Among the best of his painted portraits are those of himself (1804); "Napoleon as First Consul" (1804), Liége Museum; "Napoleon Enthroned," Hôtel des Invalides (1806); "Lemoine" (1819); "Charles X" (1829); and especially "Bertin the Elder" (1833). The Louvre contains those of "Philibert Rivière and Wife" (1806) and of "Cherubini" (1843). Ingres also designed cartoons for the celebrated glass paintings in the chapel of St. Fernando, Paris. His works were admirably engraved, especially by Richehomme and Henriquel-Dupont. The most important of his large school of pupils was Hippolyte Flandrin (q.v.).

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Künstler (Leipzig, 1884); E. T. L. Gautier, *Portraits du 19e siècle* (Paris, 1895); Henry de Chennevières-Pointel, "La nouvelle salle des portraits-crayons d'Ingres au Musée du Louvre," in *Revue de l'Art*, vol. xiv (ib., 1903); De Wyzewa, *L'Œuvre peint de Ingres* (ib., 1907). The best and most complete monograph on the life and works of Ingres is by H. Lapauze (ib., 1911).

INGRIA. See INGERMANLAND.

IN'GULPH, or **INGULF** (c.1030–1109). Abbot of Crowland, or Croyland, Lincolnshire. He is supposed to have been born in London and to have studied at Oxford. He became a favorite of Edgitha, the wife of Edward the Confessor; visited Duke William of Normandy at his court in 1051 and became his secretary. After a pilgrimage to the Holy Land he entered a Norman monastery. Here he remained till 1086, when he was invited to England by the Conqueror and made Abbot of Crowland, where he died Nov. 16, 1109. The *Historia Monasterii Croylandensis* (printed by Savile in London in 1596 and in more complete edition by Fulman, at Oxford, in 1684; translated into English for *Bohn's Antiquarian Library* by Riley, 1854) was long attributed to him. In 1826 Sir Francis Palgrave in an article in the *Quarterly Review*, and in 1862 H. T. Riley in the *Archæological Journal*, maintained by cogent arguments that the whole so-called history was little better than a novel and was probably the composition of a monk in the thirteenth or fourteenth century. These conclusions have been almost universally adopted. What few facts about him are known come from the *Historia Ecclesiastica* of Ordericus Vitalis (ed. Migne, Paris, 1855).

IN'HALA'TION (from Lat. *inhalare*, to inhale, from *in*, in + *halare*, to breathe). In medicine, a term used to signify the receiving into the lungs of vapors or gases for producing anæsthesia or for curative purposes. The ordinary manner of administering chloroform is as follows: Over a skeleton wire pan, the size and shape of a small deep saucer, a flannel bag is drawn. Chloroform is dropped on the bag, and the contrivance is inverted over the patient's nose and mouth. To give ether, a large square nose bag is made by folding fairly strong paper inside of a towel and then doubling the double fabric together and fastening it with safety pins. Less wasteful and more exact in the amount used, as well as vastly more elegant, are the regular inhalers, apparatus designed for the purpose and made of metal and rubber. Such an apparatus is necessary for the administration of nitrous oxide, or laughing gas. (See ANÆSTHETIC.) The vapor of hot water is employed in throat diseases, often affording great relief; and medicinal substances, such as benzoin and camphor, are sometimes used in conjunction, but it is often desirable to use the watery vapor without any combination. A very convenient and, in the absence of other apparatus, the only available way is to place a funnel over an open vessel containing hot water and inhale the hot vapor through the spout. A deep vessel, such as a two-quart earthen pitcher, may be used, containing a pint of boiling water—the patient breathing from the open mouth, putting his face close over the vessel, with care to moderate the heat of the contents. The vapor of carbolic acid is often beneficial as an inhalant and may be administered in a similar manner. The volatile oils, however, are most generally used. There are various kinds of apparatus for inhalation, with the common object of introducing vapor to the lungs in the proper strength or temperature and due admixture of air. Oxygen is administered by inhalation in many diseases, especially in anæmia and pneumonia. It is given from a cylinder, from which it escapes as regulated by a cork, passing through a "wash bottle" containing water before it reaches the tube, or inhaler, held in the patient's nostril or mouth.

INHAMBANE, ē'nyȧm-bä'nȧ. An important seaport town in Portuguese East Africa, situated on Inhambane Bay, in lat. 23° 50′ S., long. 35° 25′ E. (Map: Africa, H 7). It has many fine European buildings, including a fort, churches, and a mosque. Its harbor admits vessels of 28 feet draft, and its trade in wax, copal, ivory, mafurra, nuts, and rubber amounts to about £250,000 ($1,250,000) annually. Pop., about 4000, of whom 100 are Europeans and 250 Asiatics.

INHER'ITANCE (OF. *enheritance*, from *enheriter*, *inheriter*, to inherit, from Lat. *inhereditare*, to appoint as heir, from *in*, in + *heres*, heir; connected with *herus*, master, Gk. *χείρ*, *cheir*, hand, Skt. *har*, to take). In a popular sense, the acquisition of property, either real or personal, whether by will or intestacy, through the death of the former owner. In the more restricted sense of the English and American law, however, the term is confined to the transmission of real property by descent only. The popular use of the term to describe gifts, whether of land or goods, by last will and testament is wholly inaccurate. Personal property does not in any event pass by inheritance, but upon the death of the owner intestate goes to his personal representatives for purposes of administration (q.v.) and distribution (q.v.).

Strictly speaking, therefore, inheritance is confined to certain kinds of interests in land which have come to be known as estates of inheritance. (See ESTATE.) These include the two classes of estates known as fee simple and fee tail (qq.v.). In the former the inheritance is unrestricted—or "general," as it is termed—being open to all persons standing in any degree of consanguinity to the decedent, collateral as well as lineal. In the latter the inheritance is restricted to the issue of the intestate, or even to a special class of lineal descendants, as to the issue of a certain wife begotten, or even to the male or the female issue. This quality of inheritability, now regarded as an essential attribute of the absolute ownership of real property, has not always been a characteristic of such estates, but, like the corresponding quality of alienability, was gradually added to the fee as that originally existed under the feudal system of land tenure. For the rules governing inheritance, see DESCENT; HEIR; HEREDITAMENT.

The term "inheritance" is also frequently employed to describe the property or estate acquired by descent. This may, in addition to the real estates of inheritance above described, include also certain privileged chattels, known as heirlooms. (See HEIRLOOM.) Consult the authorities referred to under DESCENT.

INHERITANCE TAX. A charge or assessment on the succession or devolution of property from a deceased person to his heirs or legatees.

Such taxes were imposed in Rome over 2000 years ago and in some form have been a source of revenue in several of the continental countries of Europe almost since their organization as independent governments. In England Gladstone called the various inheritance tax charges "death duties," and the name has since come into common usage. The self-governing colonies of Great Britain, particularly Australia and New Zealand, have followed her example, and death duties are one of the chief sources of revenue in those progressive commonwealths. Taxes of a similar character were imposed by the United States government as a part of its internal revenue system during the Civil War, but were repealed some time after its close. However, in some form or other, this form of taxation is imposed in a number of the United States.

The form, rates, and method of assessment and collection of such taxes vary considerably in different states and countries. There are, however, certain general characteristics common to most jurisdictions. Such laws sometimes provide for a progressive rate according to the amount of property of the estate, also a graduated rate according to the degree of relationship of the individuals entitled thereto. In some jurisdictions the portion to which a widow or minor children become entitled is exempt up to a certain amount, and lineal descendants are favored in preference to collateral relatives whenever any distinction is made.

The English death duties are graduated from 1 per cent to 10 per cent, according to the amount involved and the degree of relationship of the beneficiaries. The Canadian provinces have followed the English statutes closely, both as to rates and in other respects. On the Continent Germany, Austria, France, Switzerland, Holland, Russia, Italy, Spain, Portugal, Greece, Denmark, and Sweden have inheritance or succession taxes.

The laws imposing such taxes have occasioned a great deal of litigation in the United States. Their constitutionality has been attacked in several States, the contestants claiming that they do not provide a uniform method of taxation affecting all persons alike, as required by the constitutions of most States, but this contention has been repudiated by the courts of most of these jurisdictions. These decisions have proceeded on the ground that such a tax is equally imposed and properly apportioned upon all classes; that it is a tax on the succession or devolution of property rather than on the property itself and is therefore uniform in its operation and effect. Deathbed gifts, made obviously to escape such charges, are usually included within the scope of these laws. The justice and convenience of this form of taxation have appealed to most economic writers, and it is rapidly growing in popular favor. Consult: B. F. Dos Passos, *Collateral Inheritance, Legacy, and Succession Taxes* (2d ed., New York, 1895); Tristram and Coote, *Probate Practice* (London, 1900); University of Wisconsin, *Inheritance Tax: A Bibliography* (Madison, 1910); Lee, Higginson and Company, *Inheritance Tax of all the States* (Boston, 1911). See DEATH DUTIES; INHERITANCE; SUCCESSION; TAX AND TAXATION.

IN'HIBI'TION (Lat. *inhibitio*, from *inhibere*, to hold back, from *in*, in + *habere*, to hold). A term used in physiology to denote a prevention or restraining action. Inhibition in a nervous mechanism is a resistance to disordered or excessive action. An inhibitory nerve is one which controls the organ or other structure to which it goes, preventing undue functional activity.

INHIBITION, WRIT OF. A writ or process directed to an individual forbidding him to do some particular act. It is derived from the civil law, where it was employed by the courts of appeal to stay the execution of judgments by inferior courts during the pendency of the appeal. The writ was used in the early English law for the same purpose, but was later superseded by the writ of prohibition. The term survives only in ecclesiastical law and in the practice of the Roman and English churches. Consult Sir Walter Phillimore, *Ecclesiastical Law* (2d ed., 2 vols., London, 1895).

IN HOC SIGNO VINCES, ĭn hŏk sĭg'nō vĭn'sēz (Lat., In this sign thou shalt conquer). The legend on a flaming cross which, according to tradition, appeared in the sky to the Roman Emperor Constantine I before his battle with Maxentius.

IN'IA. A cetacean of the family Platanistidæ, and thus related to the susu of the Ganges, which inhabits the Amazon and its larger tributaries. Only one species (*Inia geoffrensis*) is known. It reaches a length of 8 feet and may be wholly pink in color or a varying mixture of black and pink. The Indians regard it with mingled fear and superstition, and it is hard to learn what are its true habits.

ÍÑIGUEZ. See GARCÍA ÍÑIGUEZ.

INIOMI, ĭn'ĭ-ō'mī (Neo-Lat. nom. pl., from Gk. *ἰνίον*, *inion*, muscle at the back of the shoulder + *ὦμος*, *ōmos*, shoulder). An order of teleost, soft-rayed, deep-sea fishes, which are closely allied to the Isospondyli, but lack the mesocoracoid and have an imperfect connection between the shoulder girdle and the cranium. It consists of several families of fishes dwelling in the oceanic abysses, most of which have phosphorescent light organs or photophores. (See LANTERN FISH.) Consult Jordan and Evermann, *Fishes of North and Middle America* (Washington, 1896). See ISOSPONDYLI.

INI'TIATIVE. A political device, originating in Switzerland and which has recently gained a foothold in the United States, which aims to secure to the mass of the voters a more direct participation in legislation by requiring the submission either to the legislature or to popular vote of proposals for legislation initiated by one or more of such voters. In its developed form, as applied in some of the American States, the initiative may be regarded as an application of the "town-meeting" form of government to communities too numerous and complex to make that form of legislation strictly applicable, or as a device for making effective the right of petition. A petition addressed by a citizen or body of citizens to his or their representative legislature may be granted or rejected or wholly ignored. Laws providing for the initiative in effect forbid this last method of dealing with a petition asking for specific legislative action, by requiring the submission to a vote of such a measure if properly presented and supported. Historically, however, the initiative had its origin in the "direct democracies" (*Landsgemeinde*) of the smaller Swiss cantons—popular assemblies composed of all the voters of the cantons—where a single voter may require the submission of his proposal to popular vote. In the larger cantons the number of petitioners required for the initiation of a legislative measure varies from 70 in the Outer Rhodes to 12,000 in Bern. The principle has been adopted in all the Swiss cantons except Lucerne, Fribourg, and Valais, and was adopted in 1891 by the Confederation as a method of proposing an amendment to the constitution.

The initiative made its first appearance in the United States through its adoption by the State of Oregon in 1902. It has since been adopted in some 20 States, and proposals for its adoption are pending in about a dozen other States. In some States it is restricted to the initiation of ordinary legislation, but in others it is applied to the amendment of the State constitution as well. The number of petitioners required to put it into effect varies from 25 per cent of the registered voters (Arizona) to 3 per cent (Ohio). In all the States it is coupled with the referendum, requiring the submission of the proposed measure to popular vote—either, as is generally the case, in the first instance or, as in Ohio, in case the legislature fails to approve the proposal. In the latter case there is a double initiative—first to secure the consideration of a measure by the legislature and then as a method of appeal from the legislature to the body of voters.

The initiative thus takes its place as one of a number of related political devices whose object is to obviate in some degree the misrepresentative character of the American representative system by giving to the people, by direct political action, a more immediate control of the business of government. Other devices of this sort, such as the referendum, the recall of elective officials, direct primaries, the presidential preference primary, the direct election by popular vote of United States Senators, woman suffrage, and the short ballot, are described and discussed under their appropriate titles. Of all these devices of popular government the most difficult to set up as a working institution is the initiative. The technical difficulties attending the drafting of legislative measures are coming to be understood even in a country where legislation has often been of a haphazard character and where the preparation of bills has usually been left to private initiative. But even the most slipshod measure, when subjected to legislative scrutiny, may be converted by amendment into a workable and effective piece of legislation. This is clearly impossible in the case of a measure proposed by the initiative, which may be put forth by any one who secures a sufficient number of signatures to the initiating petition.

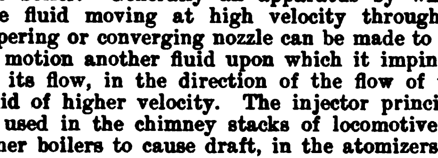
The "Wisconsin Plan," as it is called, seeks to obviate this objection by permitting any person, after securing the introduction of a bill in the legislature and not otherwise, to have the measure submitted, on a proper petition, to popular vote. As against this theoretical objection it is urged that, in those States in which the initiative has been in operation, the difficulty urged has not in practice proved to be a serious one, and that the system has demonstrated its efficacy by the good quality of the legislation which has resulted from it. However this may be, it cannot be doubted that the device is growing in popular favor, and that it is likely in the near future to be adopted in all the States of the American Union. It should be noted that both the Progressive and Socialist parties have adopted the initiative as a part of their programme of political reform. See Legislation; Primary Election; Referendum; Recall; Popular Government; Election; Electoral Reform.

INJALBERT, ăN'zhàl'bâr', Jean Antoine (1845–). A French sculptor, born at Béziers. He was a pupil of Dumont and won the Prix de Rome in 1874. At the Exposition of 1889 he won the Grand Prix and in 1900 was a member of the jury. In 1905 he was made a member of the Institute and in 1910 Commander of the Legion of Honor. His work shows powerful imagination and strong personality as well as great knowledge. Among his statues are "Hippomenes," at the Luxembourg; "Eve after the Fall," at Montpellier; "Sadi-Carnot," at Cette; "Love Conquering the Lion," "Fame," "The Laughing Child," and several others, at Béziers.

INJEC'TION (Lat. *injectio*, from *injicere*, to throw in, from *in*, in + *jacere*, to throw). A term applied in medicine to a fluid thrown into the passages or cavities of the body by means of a syringe or elastic bag. The fluids thus injected into the rectum or lower bowel are termed enemata. (See Enema.) The injection of a dilute solution of salt into the veins has been in use since about 1879 and has been found to be of great service in many diseased conditions. The injection of blood into the veins is described in the article Transfusion of Blood. See Hypodermic Medication.

INJEC'TOR (Lat. *injicere*, to throw in). Specifically an apparatus for feeding water into a steam boiler by means of a steam jet from that boiler, acting through a tapering or converging nozzle upon the mass of water to be forced into the boiler. Generally an apparatus by which one fluid moving at high velocity through a tapering or converging nozzle can be made to set in motion another fluid upon which it impinges in its flow, in the direction of the flow of the fluid of higher velocity. The injector principle is used in the chimney stacks of locomotive or other boilers to cause draft, in the atomizers or spray apparatus of physicians and perfumers, and in the burners for liquid fuels under boilers. When the pressure against which the injector feeds is equal to or nearly that of the impelling or actuating jet, the device is an injector. When the resistance pressure is much lower than that of the impelling jet, it is called an ejector. With a given pressure of the impelling jet, ejectors deliver much more liquid against their low resistance than the injector working against a high resistance.

Injectors and ejectors are of two classes: in one the water to be impelled is at the level at which the injector is set up; these are nonlifting types. In the other the water has to be raised by atmospheric pressure from a level lower than the injector, and hence the latter must first create and then maintain at its suction end a pressure below atmosphere and sufficiently so to enable the water to be raised. These are lifting injectors. The lifting injector is the general case. The accompanying diagram is a schematic presentation of the essentials of such a device. Dry steam from the steam boiler to be fed with water in the specific type of boiler-feeding in-



jector enters through the pipe *a* at high velocity. The pipe *c* leads from the tank or supply of water and is full of air, as is the body of the instrument. The rapid flow of the jet of steam and the impact of its particles carry the air above the water in the pipe *c* out of the injector to the open air through the waste pipe *g*, and the flow towards *g* therefore reduces the air pressure in *c*, which is air-sealed at the bottom by the water it contains. Hence atmospheric pressure outside of *c* forces the water up until it meets the steam jet in the "combining tube" *d*. Here two things happen: the steam is condensed by the cooler water, and the rapidly moving jet imparts some of its previously high velocity by impact upon the water. The heat energy of the mass of steam is imparted to the water, raising its temperature; the kinetic energy or living force of the jet or mass of steam passing per second is wholly imparted to the water, but, by reason of the greater mass of the water, only a part of the original steam velocity is imparted to the water. Enough remains, however, to make the combined jet of steam and water jump past the break between nozzles *d* and *e* and rush with great energy of mass and velocity in the direction of jet motion and impinge against the check valve *f*, opening it against the static pressure on its back and allowing the water to pass into the boiler against such pressure. The rush of the water jet removes all air and steam in the waste pipe and in the body of the injector and maintains the necessary low pressure in the suction pipe *c*. If the velocity of flow in *a* falls below that necessary to impart kinetic energy to the jet of water, the injector "breaks," as it is called, and steam and water escape from the waste, the suction ceases, and the instrument must be cooled off and started again.

Modern injectors have simplified the practical operation of feeding by interconnecting the waste-pipe valve and the starting-jet valve. Double-tube injectors are also much in use—sometimes called "inspirators" as a trade name—in which there are two jets side by side in successive chambers. The first is the steam jet and inducing chamber; the second is the forcing chamber, taking the first jet of warmed water and using it as a further inducing jet for a second supply of water and forcing the latter into the boiler. The injector principle was first advanced by Henri Jacques Giffard, a French engineer and mathematician. Restarting injectors are such as will resume their function after a "break" in the flow without the attention of the operator. Injectors preheat the feed water and hence are much in use where this is an advantage. They are less efficient as movers of cool water than the ordinary power pump. They are light in weight, compact, and dispose of their own exhaust steam. For a history of the development of the injector and the principles of its action, consult Kneass, *Practice and Theory of the Injector* (New York, 1910), and for descriptions and illustrations and representative forms, consult Hutton, *Mechanical Engineering of Power Plants* (ib., 1909); Inchley, *Steam Boilers and Boiler Accessories* (London, 1912); Wakeman, *Practical Guide for Firemen* (New Haven, Conn., 1906); Hughes, "Injector Metal and Fittings," in *Journal of the Institute of Metals* (London, 1911); *Proceedings of the American Railway Master Machinists Association* (Chicago, 1913). For theory, consult Wood, *Thermodynamics, Heat Motors, and Refrigerating Machines* (8th ed., New York, 1899), and Peabody, *Thermodynamics of the Steam Engine and Other Heat Engines* (6th ed., ib., 1909); and for a brief discussion, Kent, *Mechanical Engineers Pocket Book* (8th ed., ib., 1913).

The ejector principle is used in steam-engine condensers, where the flow of condensing water meets the exhaust steam, as in the combining tube *d*, and by its condensation and its flow maintains a pressure less than atmosphere in the pipe *a* which leads from the engine cylinder. The outfall through *f* need only have a velocity sufficient to overbalance the tendency of atmospheric pressure to enter and establish itself from that direction. The injector principle is also used in many forms of blue-flame wickless gas stoves, where the jet of gas is the impelling jet, and the air for combustion is entrained with and by it.

IN'JIA. See BOUTO.

INJUNC'TION (Lat. *injunctio*, from *injungere*, to command, from *in*, in + *jungere*, to join; connected with Gk. ζευγνύναι, *zeugnynai*, Skt. *yuj*, to join, and ultimately with Eng. *yoke*). A judicial writ or process of a court of equity, commanding a person or persons named therein to do or not to do a particular thing. It had its origin in the Roman law, under which system a somewhat similar process, known as an interdict, was employed. The idea was introduced into England and Scotland by the early chancellors, as a result of their search for remedies to modify the harshness of the common law and to supplement it where inadequate to meet the ends of justice, though it had at an earlier period been employed with considerable freedom by the king's court (*curia regis*). The scope of its use and application has greatly widened until to-day it is perhaps the most important remedy of an equitable nature.

The purposes for which an injunction may be employed may be described generally as follows: (1) to prevent the commission of certain wrongs of a civil nature; (2) to protect rights; (3) to compel the restoration of rights. The greatest proportion of injunctions fall under the two classes first named and are usually termed *preventive*, because they operate to prevent wrongs by restraining acts, while the third class, called *mandatory*, as descriptive of their purpose to compel the affirmative performance of an act, are more rarely used. A common example of a preventive injunction is one to restrain the continuance of a nuisance, such as generating unusual quantities of black smoke and cinders in a great city; whereas an injunction to compel the restoration of running water to its natural channel by a person who has wrongfully diverted it therefrom would be classed as mandatory. Some other important uses of preventive injunctions are: to prevent the violation of contracts; to restrain or prevent waste, or nuisance; to protect patent rights, copyrights, and trade-marks from infringement; and to stay proceedings in a court of law. The latter object is effected by enjoining one or both of the parties to the action from proceeding further in the cause. A court of equity will sometimes enjoin a party or parties within its own jurisdiction from prosecuting an action in another jurisdiction. A notable example of such exercise of power is where a United States court restrains all creditors prosecuting actions in State courts for the enforcement of their claims against a bankrupt from proceeding further in their actions, thus leaving all matters relating to his estate to its own determination.

A court of equity follows the same rules in this summary method of procedure as in the exercise of its other functions, and therefore will only grant an injunction when the remedy at law is inadequate to give a party who is wronged the complete relief to which he is entitled. One reason for issuing an injunction is to prevent irreparable damage. Where, e.g., a person maintains an offensive nuisance which operates to keep away customers from a near-by shop, the shopkeeper could recover damages in a court of law; but, as a long delay may ensue before his cause can be reached, his business may be ruined in the meantime. His damages in that event would be hard to estimate and therefore that relief would be manifestly inadequate to protect him; whereas, if the nuisance is immediately abated, in compliance with an injunction order, he is saved irreparable damage. Much criticism and controversy have been occasioned by cases where the courts have enjoined striking laborers or others from inducing or coercing workingmen to strike for the purpose of forcing their employers to grant the concessions demanded. This use of the injunction has been stigmatized as "government by injunction" and has been denounced by labor organizations and some publicists as an unwarranted, new, and arbitrary exercise of power by the courts. Except in the case of certain extreme injunctions improperly granted, this contention is not supported by legal authority, as the right to conduct one's business without interference or molestation from others in any manner is a long-established principle of the common law, the violation of which is an actionable wrong at law, and a court of equity has jurisdiction to prevent wrongs and injuries to persons and their property and to restrain combinations and conspiracies for unlawful purposes. Of course the crux of the question in all these cases is, what legally constitutes an unlawful interference with another's business; and upon this point opinions are widely divergent. There has recently been considerable agitation in favor of legislation limiting the power of the courts to issue injunctions and punish for contempt in cases arising out of labor disputes.

The courts have not defined or limited the circumstances in which relief by injunction will be granted, but reserve the right to exercise their power whenever a novel state of facts may seem to present urgent equitable grounds for doing so.

With reference to the time when they are granted and remain in force, injunctions are also classified as *preliminary*, or *interlocutory*, and *perpetual*. Where there is danger that great damage will be done by one party to another before the questions between them can be determined on their merits, a court of equity, or judge thereof, may, on application of one party to him on the bench or at chambers, at any time of the day or night, and without notice to the other party, grant an injunction to prevent the continuance of the wrongs complained of during the pendency of the action, or, if no action has been commenced, to operate as a stay until an application is made to the court by the party enjoined to have it dissolved. Upon such application all the facts on both sides are presented to the court, and it may then dissolve the injunction or make it permanent. In order that the party thus summarily enjoined may not suffer damage if it is finally determined that he was within his rights in doing the acts complained of, the court or judge requires the party seeking the relief to give sufficient security that he will pay all damages that his adversary may sustain by reason of the injunction if it is thereafter dissolved for lack of sufficient legal grounds to sustain it. This temporary, or interlocutory, injunction may be made perpetual if the court later determines that the grounds advanced for its continuance are valid in law and have been sustained by the proof.

For many years the granting of the remedy of an injunction was the special prerogative of the courts of chancery in England and the United States. During the last century, however, the power of issuing injunctions in certain classes of cases was by statute conferred on the ordinary courts of common law in England and in several of the United States. The merging of the courts of equity and common law in a single tribunal in England and most of the United States has done away with the distinction. See CHANCERY; EQUITY.

Consult: Beach, *Treatise on the Law of Injunctions* (Chicago, 1895); W. W. Kerr, *Treatise on the Law and Practice of Injunctions* (4th ed., London, 1903); J. L. High, *Treatise on the Law of Injunctions as Administered in the Courts of the United States and England* (4th ed., Chicago, 1905); H. C. Joyce, *Treatise on the Law Relating to Injunctions* (3 vols., Albany, 1909); A. P. Thom, *Judicial Power and the Power of Congress in its Relation to the United States Courts* (Washington, 1912).

IN'JURY (from Lat. *injuria*, harm, from *injurius*, acting wrongfully, from *in-*, not + *jus*, right, law). In the legal sense, an actionable wrong; any act in violation of the rights of another of which the law will take cognizance by allowing the injured party an action against the wrongdoer to recover specific property or damages or both. In the practical sense the term may also be said to embrace actionable wrongs against the state, in which case the result sought by the action brought by or on behalf of the state is the punishment of the offender, usually by criminal process. Injury, in the legal sense, is to be distinguished from wrongs which are *damnum absque injuria*, i.e., acts resulting in harm to another for which the law gives no remedy.

An injury may also be *injuria absque damno*, i.e., an injury which, although a technical invasion of a right, is without actual damage to the injured party, in which case the injured party may recover nominal damages or, in rare cases, obtain an injunction restraining the wrongdoer. The principles governing the law of civil or private injury are discussed at length under TORT and under EQUITY, which exercised its preventive jurisdiction over torts. See also CONTRACT; TROVER; TRESPASS. The principles governing the law of public wrongs are discussed under CRIME; CRIMINAL LAW.

INK (OF. *enque*, *enche*, Fr. *encre*, Prov. *encaut*, It. *enchiostro*, ink, from Lat. *encaustum*, Gk. *ἔγκαυστον*, *enkauston*, purple ink, from *ἔγκαυστος*, *enkaustos*, burned in, from *ἐγκαίειν*, *enkaiein*, to burn in, from *ἐν*, *en*, in + *καίειν*, *kaiein*, to burn). Any colored fluid used in writing or printing. The use of ink for writing was known to the ancients, and papyri and manuscripts dating back to more than 4000 years ago are to be found in various museums. Many of these writing fluids were pigments, consisting chiefly of various forms of carbon, such as ivory black, lampblack, and soot mixed with gum, in order to avoid too great fluidity; others were apparently actual dyes of iron and acids, to which carbon was added. The liquor of the cuttlefish is reported by Cicero and Pliny to have been used among the Romans as a writing fluid. Elegant manuscripts, written in gold and silver inks, are well known, and among these may be mentioned the celebrated *Codex Upsal*, which is written in silver ink on violet parchment, the initials and certain passages being in gold. Some written wholly in red ink, made of vermilion, purple, or cinnabar, are still preserved, although red was more frequently used for the headings and initials of books, chapters, and pages. The emperors of Constantinople were in the habit of signing their acts in red ink, and the first secretary was guardian of the vase containing the cinnabar, or vermilion, which the emperor used. Green ink, though rarely found in charters, often occurs in Latin manuscripts, especially those of later years. It was also used by the guardians of the Greek emperors before their wards attained their majority.

Inks are commonly treated under the two heads of writing ink and printing ink.

Black Writing Ink. Ordinary black writing ink is a compound obtained by the action of ferrous sulphate on an infusion of nutgalls or any similar compound containing tannin and is essentially a ferroso-ferric gallate. Typical of this kind of ink is the one consisting of the following ingredients: nutgalls, 12 pounds; ferrous sulphate, 5 pounds; gum Senegal, 5 pounds; and 12 gallons of water. It is prepared by carefully selecting nutgalls, preferably the variety from Aleppo, as that contains a larger proportion of gallic and tannic acids than other varieties. They are then crushed and treated with distilled water for several days, after which the clear liquid is carefully drawn off, and to it is added a clear mucilage, made by previously dissolving the gum in hot water and filtering. Finally, the ferrous sulphate is dissolved separately and mixed with the foregoing solutions. Some recommend, instead of a solution of ferrous sulphate, that clean iron filings be added to a portion of nutgalls and gum and the liquid agitated until it becomes deep black in color. In either case the color is due to the oxidation of the iron salt and its combination with the gallic acid in the solution. It has been determined that the proportion of three parts of the galls to one part of the ferrous sulphate yields a satisfactory ink, but in actual practice more ferrous sulphate is usually added. In order to obtain a deeper black, logwood and indigo extracts are sometimes added. Runge in 1849 described a chrome ink which he made by adding 1 part of potassium chromate to 1000 parts of a solution of logwood, made by exhausting 1 pound of logwood with 6 quarts of boiling water. The potassium chromate is added gradually when the solution is cooled, the mixture being constantly stirred during the addition. This ink is cheap, permanent on paper, and unaffected by exposure to water or acids. The class of inks known commercially as alizarine inks as a rule do not contain alizarine at all, but are gallate of iron inks acidified with acetic acid to prevent the formation of sediment. The ink, however, acts upon a steel pen until a protective coating is formed upon the pen. The use of ammonium vanadate, with an infusion of nutgalls, produces an exceedingly black writing fluid, but the expense of the vanadium salt has prevented its common use. Certain aniline blacks, e.g., nigrosine, owing to their fluidity and the fact that they form no sediment, have been extensively used in fountain pens.

Red Writing Ink. Red inks are commonly prepared from brazilwood, cochineal, or carmine; those made from brazilwood are regarded as more permanent, while those from cochineal yield the most brilliantly colored fluids. An excellent quality of red ink may be had by boiling 2 ounces of brazilwood in 32 ounces of water, and by adding to that solution, after straining, ½ ounce of stannous chloride (tin salt) and 1 dram of gum arabic. Brazilwood inks have been almost wholly, and cochineal inks largely, replaced by aniline dyes. Magenta or aniline red and eosin are the chief dyes used. They are usually dissolved in spirit, which is then suitably thinned out with water.

Blue Writing Ink. Ordinary blue ink is a preparation of Prussian blue and may be made by triturating 6 parts of this substance and 1 part of oxalic acid with a little water to a perfectly smooth paste and diluting the mass with a sufficient quantity of distilled water. An excellent blue ink is made by dissolving soluble Paris blue ("cornflower blue") in alcohol.

Aniline Writing Inks. The general formula for making aniline inks is to dissolve 15 parts of any aniline color in 150 parts of strong alcohol in a glass vessel and, after allowing the solution to stand for three hours, adding 1000 parts of distilled water; the liquid is then heated gently for some hours, or until the odor of the alcohol has quite disappeared, whereupon it is mixed with a solution of 60 parts of powdered gum arabic in 250 parts of water. This formula may be followed for the ordinary violet or purple ink, as well as for the many other colors, such as green, yellow, etc., which are sometimes used.

Metallic Inks. Gold, silver, and similar metallic inks may be made by taking equal parts of the metal in leaf and triturating with honey until the metal is reduced to the finest possible state of division; then agitating with 30 parts of hot water, allowing to settle, decanting the water, repeating the washing several times, and finally drying the metal and mixing it with a medium consisting of equal parts of pure gum arabic and soluble potash glass in four parts of distilled water. Three or four parts of this medium will be found sufficient for one part of the powder.

Special Inks. Copying ink is made by adding a thickening substance, such as gum arabic, gum Senegal, dextrin, or glycerin, to ordinary ink. Hectograph inks, designed to furnish approximately 100 copies, consist of some strong soluble coloring matter in 10 per cent glycerin solution. An aniline blue is usually employed. Dyes insoluble in water or glycerin, such as magenta, are dissolved in alcohol before mixing with the other ingredients. The ordinary marking or indelible inks are made by dissolving a silver salt, usually the nitrate, in water and ammonia, to which a small quantity of gum is added. Such inks may be removed by treatment with potassium cyanide. More permanent inks may be made by using solutions of gold or platinum chloride.

Sympathetic or Secret Inks. These are fluids which produce colorless writing upon paper; but, when the latter is subsequently exposed to heat or proper chemical action, the writing becomes colored and clearly readable. Among the favorite secret inks may be mentioned solutions of lead acetate, whose invisible marks on paper turn black on exposure to sulphureted hydrogen, owing to the formation of sulphide of lead. Cobalt nitrate solution furnishes another favorite secret ink, its marks on paper turning blue on treatment with oxalic acid. A solution of either cobalt chloride or the nitrochloride will yield characters which are green when heated, but which disappear on cooling; also a weak solution of nickel and cobalt chlorides will produce green tracings.

Ink Powders. These are nothing but the common constituents of ink in a dry state. Black ink powder may be made by mixing 4 parts of powdered nutgalls, 2 parts of ferrous sulphate, and 1 part of gum arabic. The dry aniline colors may be similarly used.

Printing Inks. Any ink used in printing is essentially a pigment of the required color, mixed with an oil or varnish. John Underwood in 1857 before the Society of Arts described the properties essential to a good printing ink as follows: It must distribute freely and easily and work sharp and clean; it must not have too much tenacity for the type, but come off freely and adhere to the paper; it must dry almost immediately on the paper and not dry at all on the type or rollers; it should be practically proof against the effects of time and chemical reagents and never change color. The pigment used for the best black ink is lampblack, and the vehicle is usually linseed oil. Mineral pigments are generally used to produce the different colored printing inks. Details concerning the manufacture of printing inks may be found in any of the larger handbooks on printing. In lithography the writing ink for drawing on the stone may consist of equal parts of tallow, wax, soap, and shellac, mixed up with a sufficient quantity of Paris black. The printing ink used to take the impression of engraved plates, with a view to transference to the stone, may consist of equal parts of tallow, wax, soap, shellac, and pitch.

Consult: Spon, *Workshop Receipts* (London, 1883); Schluttig and Neumann, *Die Eisengallustinten; Grundlagen zu ihrer Beurteilung* (Dresden, 1890); Frazer, *Bibliotica; or, the Study of Documents* (Philadelphia, 1901); Lehner, *Ink Manufacture*, translated by Morris and Robson (London, 1902); Andes, *Schreib-, Kopier- und andere Tinten* (Vienna, 1905); Thorpe, *Dictionary of Applied Chemistry* (London, 1912); W. A. Melcher, *Mechanical Ink Marks* (Philadelphia, 1914).

INK'BERRY, or WINTERBERRY (*Ilex glabra*). An evergreen shrub, 2 to 4 feet high, which belongs to the holly family (*Aquifoliaceæ*), and which is found upon sandy soils in the United States from Massachusetts to Florida. The leaves are dark green, an inch or more long, wedge-lanceolate or oblong, smooth and shining on the upper surface; the sterile flowers in clusters of from three to six, fertile ones solitary and followed by small black berries. Its leaves and bark were formerly used as a remedy in intermittent fever. Its principal use is for decoration, for which purpose it is shipped to New York and Philadelphia from southern New Jersey. Sometimes it takes the place of the American holly (*Ilex opaca*), but it is not so ornamental.

INK CAP (*Coprinus atramentarius*). An edible toadstool. See MUSHROOM.

INKERMAN, Iŋ'kĕr-măn'. An elevated site in the Crimea, near the eastern extremity of the harbor of Sebastopol (Map: Russia, D 6), memorable as the scene of a battle of the Crimean War between an army of Russians about 40,000 strong and detachments of the allied forces, consisting of about 14,000 troops actually engaged. At about five o'clock on the morning of Nov. 5, 1854, the Russians, who had marched from Sebastopol, concealed by the darkness and a thick, drizzling rain, appeared crowding up the slopes of the plateau on which the allies were posted. Here a portion of the English Royal Guards made an heroic stand for six hours against a body of Russians that was probably five times as numerous. When victory seemed almost assured to the Russians, French reënforcements came to the aid of the British and by a splendid charge drove the enemy off the field.

IN'KLE AND YAR'ICO. A drama by George Colman the Younger, produced in 1787.

IN'KNEE. See KNOCK-KNEE.

IN'LAY'. A general word for decorative or picture ornament, usually flat, produced by the insertion or application on a hard surface of pieces of wood, metal, shell, ivory, tile, stone, or enamel (glass), in contrasting colors; mostly on furniture, walls, floors, and jewelry. In the Metropolitan Museum, New York, is an Egyptian stool, dating from about 2000 B.C., with legs and bottom cross rails terminating in ducks' heads, the eyes and markings on which are rendered by inlays of ivory and ebony. There are similar stools in the British Museum and in the Louvre. In the *Odyssey* Ulysses, describing to Penelope the bridal bed that he has made, says: "Beginning from the headpost, I wrought at the bedstead till I had finished it, and made it fair with inlaid work of gold and of silver and of ivory." Many of the bronze mounts of beds that survive from Pompeii have inlays of silver and of copper. Much of the jewelry (q.v.) of the Germanic tribes consisted of *plate inlay*—garnets or red glass jewels cut in slices and inlaid on gold plate. Other methods of jewelry inlay are cloisonné and champlevé. (See ENAMEL.) Other metal inlays are niello (q.v.) and damaskeening (q.v.). The Italian name for the famous Florentine colored-pebble inlays is pietra dura (q.v.). All inlays of small and comparatively uniform pieces of colored glass, marble, and other stone are grouped under the head of mosaic (q.v.). The Italian name for wood inlay is tarsia (q.v.). The French name for furniture inlays, especially thin wood or veneer (q.v.) inlays, and inlays of the type developed by André Charles Boulle (q.v.), is marquetrie. The name for floor mosaics of wood, large in scale and from ¼ to 1¼ inches thick, is parquetry (q.v.). Mosaic inlay of carnelian, jasper, agate, jade, lapis lazuli, and other beautiful stones, on white marble was introduced into India in the sixteenth century by the French artist who decorated the Taj Mahal (q.v.). Of this kind of work there is a splendid example in the Metropolitan Museum, New York, in the form of a pedestal of white marble, one of four that formerly carried the platform of the gorgeous peacock throne of the palace of Shah Jehan (reigned 1628–58) in

Delhi. Both base and abacus of the pedestal, that is 22½ inches high with capital 11 inches square, are inlaid with floral arabesque, and the short bulbous shaft is 16-sided and faceted into triangles and hexagons, each hexagon being inlaid with conventional flowers.

IN'MAN, Henry (1801–46). An American portrait, genre, and landscape painter. He was born at Utica, N. Y., Oct. 20, 1801, and was for seven years an apprentice pupil of John Wesley Jarvis in New York City. He was the first vice president of the National Academy of Design. He excelled in portrait painting, but was less careful in genre pictures. Among his landscapes are "Rydal Falls, England," "October Afternoon," and "Ruins of Brambletye." His genre subjects include "Rip Van Winkle," "The News Boy," and "Boyhood of Washington"; his portraits, those of Henry Rutgers and Fitz-Green Halleck in the New York Historical Society, of Bishop White, Chief Justices Marshall and Nelson, Jacob Barker, William Wirt, Audubon, De Witt Clinton, Martin Van Buren, and William H. Seward. In the Metropolitan Museum, New York, are his "Martin Van Buren," "The Young Fisherman," "William C. Maccready as William Tell." During a year spent in England, in 1844–45, he painted Wordsworth, Macaulay, John Chambers, and other celebrities. He returned to America in failing health, and at the time of his death, Jan. 17, 1846, was engaged on a series of historical pictures for the Capitol at Washington.

IN MEMO'RIAM. A poem by Tennyson (1850), in memory of his friend Arthur Henry Hallam.

INN, In. An important tributary of the upper Danube, rising in the southern part of the Swiss Canton of Grisons, at an altitude of over 8000 feet (Map: Germany, E 4). It flows through the canton in a northeastern direction, traversing the valley of Engadine, and as a violent mountain torrent enters Tirol through the Finstermünz Pass. It maintains its northeastern direction through Tirol, where its valley is famous for its scenery, and turns north at Kufstein, a short distance below its entrance into Bavaria. At the town of Rosenheim the Inn increases considerably in volume, becoming broad and filled with islands, and it exceeds the Danube in length and volume down to the point at Passau where it enters. The total length of the Inn is about 320 miles. It becomes navigable at Hall, a short distance below Innsbruck, but its commercial importance is greatly detracted from by the rapidity of its course. It is largely used for floating timber rafts from above Innsbruck. Its chief tributaries are the Salzach and the Alz.

INN (AS. *inn, in*, house, chamber, from *in*, within, Goth., OHG., Ger., OIr., Lat. *in*, Gk. *ἐν*, *en*, in). The older English name of a place of public entertainment for travelers. In the early ages, when among all except the most savage peoples the law of hospitality was strictly interpreted, and when, owing to the unsettled condition of most lands, it was a necessity of existence, there was little need for public houses. The earliest approximation to what was later meant by an inn is found in the caravanserais (q.v.) of the East—unfurnished lodgings on the highroads which travelers might occupy on their passage. Such was the "inn" mentioned in connection with the birth of Christ. The temples of the ancient religions usually afforded shelter for pilgrims to their shrines. This custom has been kept up in pilgrimage places of a later time; thus, St. Philip de Neri had an immense hospice built to receive those who came to the jubilee of 1600.

Under the Roman emperors houses were established at the posting stations on the great roads, which began to approximate to the modern inn. These were not, however, open to all comers, but were at the service of Imperial messengers and of favored persons who could show an authorization known as *diploma tractatorium*. There were also lodging places for unofficial wayfarers, known as *diversoria* or *stabularia*, the latter affording accommodation to both man and beast. A classical description is that of Horace in his account in the *Satires* of his journey to Brundisium, where he characterizes the innkeeper in a spirit of modern protest as *perfidus caupo*. The city of Rome had many small inns, or rather lodging houses, which had a bad name and were daily inspected by the lictors of the prætor or ædile.

In Christian times, hospitality being named by St. Paul as a special duty of a bishop, the episcopal cities were the first to provide shelters for strangers; and the monasteries provided shelter and food for travelers throughout the Middle Ages. Some establishments of this kind remained celebrated even at a later date, such as those on the Alpine passes of the Great and Little St. Bernard, the Simplon, and Mont Cenis. The unusual amount of traveling brought about by the Crusades led to the establishment of brotherhoods specially devoted to the duties of hospitality, whether the recipients of it were sick or well. See Hospitalers.

The modern inn, at which entertainment was afforded as a matter of business, was of later growth. Erasmus gives a vivid and amusing picture of the crude provisions of the German inns in his time. Nowhere in Europe did these establishments so soon attain a recognized and respectable character as in England, where many of the old inns, with designations frequently adopted from the devices of powerful families, became famous—in London, e.g., the Angel, the Bell, the Belle Savage, the Bull and Mouth, and the White Horse. The older ones were usually built round a courtyard, entered from the street by a wide covered passage. This form, possibly a survival of Roman architectural methods, was common also in France and Italy. The English inns play no small part in the literature of the eighteenth and early nineteenth centuries; and where they still exist, in the smaller places, the friendly personal attention to the guest's comfort gives them an attractiveness seldom found in the more pretentious modern hotel (q.v.). The spread of railways all over the civilized world has given rise in great cities to a host of hotels of immense size and often palatial in their appointments, while the bicycle and the motor car have greatly increased the number and the quality of inns in smaller and less accessible places. See Innkeeper.

Bibliography. Michel and Fournier, *Histoires des hôtelleries, cabarets, hôtels garnis, etc.* (2 vols., Paris, 1851); Jusserand, *Les Anglais au moyen âge* (London, 1884); Liebenau, *Das Gasthof- und Wirtshauswesen der Schweiz in älterer Zeit* (Berlin, 1891); Borchardt, *Das Gast- und Schankgewerbe in Vergangenheit und Gegenwart* (Greifswald, 1901); M. C. Crawford, *Among Old New England Inns* (New York, 1907); Maskell and Gregory, *Old Country Inns of England* (ib., 1907); Hackwood, *Inns, Ales, and Drinking Customs of Old England* (ib., 1909).

INNATE IDEAS (Lat. *innatus*, inborn, from *in*, in + *nasci*, to be born). Ideas which by some philosophers are supposed to form part of the actual equipment or content of consciousness at birth, or, if they do not appear till later, are supposed not to be due to any experience falling within the life of the individual. The difficulty of accounting for our universal and necessary judgments (see JUDGMENT; INDUCTION) gave rise to this theory of innate ideas. We find the first suggestion of this theory in Plato's (q.v.) doctrine of reminiscence, and a vigorous defense, and perhaps the most elaborate statement of it, in Leibnitz's philosophy. Kant advocated not innate but a priori conceptions, the a priori being distinguished from the innate in that a priori conceptions are not merely formed at birth but are transcendental. (See KANT.) Since Kant's day innate ideas have played small part in philosophy save in the Scottish school (q.v.), being replaced among evolutionary writers by inherited tendencies to think in certain definite ways.

INNER HOUSE. The name given in Scotland to the higher division, or chamber, of the great court of the kingdom, the Court of Session (q.v.). It exercises an appellate jurisdiction over the inferior division, known as the Outer House, though its original jurisdiction is in general coördinate with that of the latter.

INNER MISSION (Ger. *Innere Mission*). The name given in Germany to a movement originated by Theodor Fliedner (q.v.) and further developed by Johann Hinrich Wichern (q.v.), who gave it its name in 1848. It is intended to elevate the whole man, and so, besides specific Church work, such as Sunday schools, rescue missions for drunkards and prostitutes, meetings for sailors, railroad employees, and strangers, it supports deaconesses to nurse the sick, maintains asylums and homes of all kinds, and takes part in the Red Cross work. Underneath all this exertion is the idea that until the spiritual nature is aroused little can be done for permanent improvement. It is distinctively a Protestant movement. There is a central committee, but it does not exercise control of the local committees. Consult: H. Behm, *Die Innere Mission, eine kirchliche Reformbewegung des 19. Jahrhunderts* (Gütersloh, 1892); *Fünfzig Jahre der Inneren Mission* (report of the Central Committee, Berlin, 1898); Schaffer, *Kalendar der Inneren Mission* (Gütersloh).

INNER PERCEPTION. See INTROSPECTION.

INNER RHODES, or **INNERRHODEN.** See APPENZELL.

INNER TEMPLE. One of the four ancient guilds of lawyers known as Inns of Court in London, having the exclusive privilege of calling persons to the English bar. It, together with its sister society, which came to be known as the Middle Temple, derived its name from the fact that early in the fourteenth century it gained possession of the New Temple, erected a short time before by the order of Knights Templars, as its "hostel," or place of residence. See INNS OF COURT.

INNES, In'ĕs, COSMO (1798–1874). A Scottish lawyer and antiquary, born at Durris. He was educated at the High School of Edinburgh and at the universities of Aberdeen, Glasgow, and Oxford. He studied law, but never had a large practice. He arranged the documents of Register House and edited *Rescinded Acts* and *Acts of the Scots Parliament, 1124–1707.* He displayed so great an interest in the pre-Reformation period that he was suspected of sympathy with Rome. From 1846 to 1874 he was professor of constitutional law and history at Edinburgh. His works, besides the editions mentioned and many chartularies of Scottish religious houses, were: *Scotland in the Middle Ages* (1860); *Sketches of Early Scotch History* (1861); *Lectures on Scotch Legal Antiquities* (1872); *Memoir of Dean Ramsay* (1874).

INNES, THOMAS (1662–1744). An historian of Scotland. He was born at Drumgask, Aberdeenshire, in 1662 and was educated in Paris, where he graduated, M.A., in 1694. He passed most of his remaining years in Paris, occasionally visiting England and Scotland, chiefly for historical research. The great object of his life was to refute the fabulous narratives of Scotland, which had been hitherto generally accepted by his countrymen, and to supply in place of fable a true history. The preparatory task he accomplished in his *Critical Essay on the Ancient Inhabitants of . . . Scotland* (2 vols., London, 1729). In the preparation of this work he examined all the manuscripts and other material relating to the subject which he could find in France, England, and Scotland. The task was extremely difficult, for in his time most of these manuscripts were wholly unknown except to a few antiquaries; but the success of his labor is admitted by all who are acquainted with this portion of Scottish history. The *Critical Essay* has been reprinted with a memoir of the author by Grub in his *Historians of Scotland*, viii (Edinburgh, 1879). After finishing the critical part of his task Innes began his constructive work in his *Civil and Ecclesiastical History of Scotland.* The first volume only was completed by the author, and the second, so far as he had progressed with it, reaches merely to the year 821 (ed. by Grub for the Spalding Club, Aberdeen, 1853). Besides these principal works he wrote many dissertations and letters and made valuable collections of manuscripts. His death occurred in 1744. In addition to his *Memoir*, by Grub, mentioned above, consult: Chambers, *Biographical Dictionary of Eminent Scotsmen* (Glasgow, 1837); Forbes, *Ane Account of the Familie of Innes* (compiled 1698; printed for Spalding Club, Aberdeen, 1864); Thomas Cooper, in *Dictionary of National Biography*, vol. xxix (London, 1892).

INNESS, In'ĕs, GEORGE (1825–94). The greatest of early American landscape painters. He was born at Newburgh, N. Y., May 1, 1825, and passed his boyhood at Newark, N. J., whither his family had removed. He took his first drawing lessons when 14 years of age, but two years later entered a store. Soon afterward he worked for one year with a firm of map engravers, but delicate health forced him to relinquish this occupation. Following his natural bent, he studied and made sketches from nature near Newark, and two years later worked for a short time in the studio of Régis Gignoux in New York. There he opened a studio of his own, achieving material success; but, dissatisfied with his own work, he studied prints of the old masters, and finally, through a patron and friend, was offered a trip abroad. He spent 15 months at Rome, returning with a style still unformed. In 1851 he spent a year in Paris, acquiring and assimilating, but without imitating. He was associated especially with the painters of Barbizon, whose aims were similar to his own. Studying their works, he began to form the individual style by which he is chiefly known. On his return he first lived in Brooklyn, N. Y., then in Medfield, Mass., and in 1862 made his home in Eagleswood, near Perth Amboy, N. J. In 1868 he was elected to the National Academy and later to the Society of American Artists. He again went abroad in 1871, remaining four years, chiefly at Paris and Rome. The latter part of his life was spent in and near New York, and his last years at Montclair, N. J. While traveling for recuperation, he died at Bridge of Allan, Scotland, Aug. 3, 1894. He was a man of profound spirituality, much given to mystic and psychical speculation, and in later life became a Swedenborgian. He possessed high intellectual qualities and keen wit and was always ready to express his thoughts on art subjects with strong, clear statements.

Inness is justly considered the most prominent figure in early American landscape, by the excellence as well as the scope of his art and the versatility of his treatment. Although he preferred the rich tones of the autumn and the sunset, he was equally successful with gray days, witness his magnificent "Woodgatherers," in possession of Mrs. George A. Hearn. His subjects included the pageants of sunrise, high noon, sunset, and evening; each picture seeming to pulsate with luminous qualities and atmospheric charm. Their chief beauty is one of color, his line tends to be indistinct; but the poetic sentiment expressed is always profound. He was essentially a painter of moods and emotions. His works, as to style, may be classed into two periods. The first period includes his early years of conscientious study, when great importance was given to detail, and an intimate knowledge of all the forms of nature; the subjects of these paintings were often panoramic in character, although always good in composition and color tone. After 1878 his works were rather the interpretation of some passing effect or emotion; they were full of personality and expressed with great breadth and simplicity in technique.

In public collections Inness is best represented in the Art Institute of Chicago, which devotes to him an entire room, containing 18 pictures, among them the "Millpond," "Florida Pines," "Threatening," and "Rainbow after a Storm." In the Metropolitan Museum of New York are seven, including "Peace and Plenty," "Delaware Valley," "Autumn Oaks," and "Spring Blossoms"; the National Gallery, Washington, contains four fine examples, including "September Afternoon," the well-known "Georgia Pines," and "Niagara." Inness is represented also in the museums of Brooklyn, Boston, Worcester, Buffalo, Pittsburgh, Toledo, St. Louis, and other cities, and very extensively in private collections of American painting.

Bibliography. No satisfactory biography of Inness has yet been written. Consult, however, the charming appreciation by his pupil Elliott Daingerfield, *George Inness, the Man and his Art* (New York, 1911); id., *Fifty Paintings by George Inness* (ib., 1913). Consult also: A. Trumble, *George Inness, a Memorial* (ib., 1895); C. H. Caffin, *American Masters of Painting* (ib., 1902); and especially Samuel Isham, *History of American Painting* (ib., 1905).

INNESS, George, Jr. (1854-). An American animal and landscape painter. He was born in Paris, of American parentage, and was a pupil of his father, George Inness, in Rome and for a few months of Bonnat in Paris, afterward sharing his father's studio in New York. From 1895 to 1899 he had a studio in Paris, exhibiting annually at the Salon. He was elected a member of the National Academy in 1899. In 1913 he became connected with the *Century Magazine*, in which his work frequently appeared thereafter. His "Shepherd and Sheep" and "The First Snow at Cragsmoor" are in the Metropolitan Museum, New York. His animal pictures, such as the "Monarch of the Farm," the "Surf Horse," and the "Mother of the Herd," are vigorous and well drawn; his landscapes, such as "The Coming Storm" and "Morning on the River," resemble his father's latest work, having the same rich haze of color, with the light glowing through.

IN'NISFAIL (Ir., Island of Destiny). An ancient name applied by the bards to Ireland.

IN'NISKIL'LING. See Enniskillen.

INN'KEEP'ER. In point of law an inn is a public house of entertainment for travelers. An innkeeper is a person who holds himself out as engaged in the business of receiving and affording accommodation (including food, drink, and lodging) for travelers or other transient guests for compensation. A tavern, being a place where only food and drink are served, was not included in the term "inn"; but the more modern "hotel" is, in a legal sense, an inn.

From the earliest times the common law regarded innkeepers (like common carriers, wharfingers, and farriers) as persons engaged in a public calling and therefore as coming under peculiar obligations to those whom they served. The innkeeper is legally bound, so long as he has accommodations, to receive all proper persons applying for accommodation and is liable in damages for his failure to do so. He is not bound, however, to receive one who is drunk, disorderly, affected with a contagious disease, or who is otherwise obnoxious. The prospective guest is not entitled to select whatever accommodation the inn affords, and if he will not accept such reasonable accommodation as is offered the innkeeper may refuse to serve him. As an incident of his public calling, the innkeeper has a lien on the horse and carriage and goods of the guest for his bill or reckoning which entitles him to detain them until the bill is paid, even though they are not the property of the guest (see Lien), but he cannot detain the person of his guest to enforce payment.

While an innkeeper has his remedy by lien for his charges, he is under great responsibility for the safety of the goods of his guests. In general, he is absolutely liable for the safety of all goods which form a part of the traveling equipment or luggage of a guest, unless the loss occurs by act of God or the public enemy. Hence the innkeeper is liable to his guest for loss by fire or theft, although in a few American States the innkeeper is exempted by statute from liability for loss by fire not caused by the negligence of himself or his servants. The innkeeper is excused if the loss is caused by the guest's own negligence—as, e.g., by his leaving the door of his room unlocked or by his leaving a box or package containing valuables in a public room of the inn without delivering the package to the innkeeper or his servants. An innkeeper cannot escape liability by posting a notice in the guest's room or other part of the house to the effect that he will not be answerable for such losses, such notice being contrary to the policy of the law which imposes the extraordinary liability on the innkeeper. He may, however, make reasonable regulations for protecting the property of the guests, as by requiring all valuables belonging to guests to be deposited in the innkeeper's safe; and if the guest after fair notice fails to comply with the regulation, the innkeeper is not liable for loss of the valuables, unless due to his own misconduct or that of his servants.

One who takes his meals in a public restaurant attached to an inn is not a guest of the inn itself, and his rights are merely those of a casual boarder. An innkeeper may entertain boarders living regularly in his house as well as transient guests or travelers; but as to these his liability is only that of a boarding-house keeper. Innkeepers are subject to various statutory regulations which, owing to the fact that the innkeeper is engaged in a public calling, do not violate any of the constitutional provisions guaranteeing the rights of citizens. Thus, he may be compelled to keep a regular register of his guests, provide safety appliances to avoid danger of fire, and he may even be subject to regulations as to food and accommodations. (See PUBLIC CALLINGS; BOARDING HOUSE; LIEN.) Consult: J. Schouler, *Law of Bailments* (Boston, 1880); Pymar, *Law of Innkeepers* (London, 1892), a comparison of English and Roman laws; Jeff and Hurst, *Law of Innkeepers* (ib., 1904); J. H. Beale, *Law of Innkeepers and Hotels* (New York, 1906); *American and English Encyclopædia of Law* (ib., 1909–).

IN'NOCENT. The name of 13 popes.—INNOCENT I (Pope, 402–417), a native of Albano. His pontificate was one of the most important in the early centuries, in its development of the relations of the Roman see with other churches, both Eastern and Western. He seems to have extended, if not originated, the system of naming legates to represent the Pope. He maintained with a firm hand the right of the Roman Bishop to hear appeals from other churches, and his letters abound with assertions of universal jurisdiction. At the request of St. Augustine and the North African bishops, in 404, he induced the Emperor Honorius to pass laws for the protection of the Catholics against the Donatists. He strongly supported St. John Chrysostom against his opponents. His last years were full of trouble, owing to the attacks of Alaric upon Rome, which in 410 was pillaged, with the exception of the Shrine of the Apostles. His last two letters were written to encourage St. Jerome in his difficulties with the troublesome Eustochium and Paula and with the Origenists. The whole of his important correspondence is in Migne, *Patrologia Latina*, xx. Consult H. H. Milman, *History of Latin Christianity*, vol. i (New York, 1903), and Hartmann Grisar, *History of Rome and the Popes in the Middle Ages*, English translation edited by L. Cappadelta (3 vols., London, 1911–12).

INNOCENT II (Gregorio Papareschi). Pope, 1130–43. He was opposed by a faction among the cardinals, who set up an antipope under the title of Anacletus II. But Innocent was supported by Louis VI, the French bishops, and St. Bernard, and restored to Rome by Lothair, whom he crowned as Emperor. Anacletus still maintained possession of the castle of Sant' Angelo until his death, in 1138, and Innocent was obliged to absent himself from Rome during much of that time. In 1139 he held the second Lateran Council, which was attended by about 1000 bishops, and confirmed the condemnation pronounced by several councils on Abélard and the followers of Arnold of Brescia, and excommunicated Roger, the King of Sicily. In 1141 a conflict regarding the appointment of archbishops arose between the Pope and his former supporter, Louis VII, which resulted in an interdict covering any place where the King might be, and only removed by Celestine II. Consult: Mühlbacher, *Die streitige Papstwahl des Jahres 1130* (Innsbruck, 1876); Martens, *Die Besetzung des päpstlichen Stuhles unter Heinrich III. und Heinrich IV.* (Freiburg, 1886); H. K. Mann, *Lives of the Popes in the Early Middle Ages*, vols. ix, x (London, 1914); and the letters of Innocent II in Migne, *Patrologia Latina*, clxxix (Paris, 1844–64).

INNOCENT III (Lotario de' Conti). Pope, 1198–1216. This was by far the greatest Pope of the name, and under him the power of the papacy over temporal authority was more widely extended than ever before. He was born at Anagni in 1161 and made Cardinal by his uncle, Clement III, after a distinguished scholastic career in Paris, Bologna, and Rome. His election to the papacy at the age of 37, while he was still a layman, was looked upon with misgiving, which finds expression in a poem by the famous Walther von der Vogelweide: "O wê, der bâbest ist ze junc: hilf, hêrre, dîner kristenheit" (Alas, the Pope is too young: help, Lord, thy Christendom). But the combined strength and wisdom of his rule soon allayed these fears. His first success was the restoration of the papal authority in Rome and the States of the Church, but he soon extended his influence to every part of Europe. In Germany he adjudicated with authority upon the rival claims of Otho, son of Henry the Lion, and Philip of Swabia; and a second time he interposed effectually in behalf of his ward, Frederick II. In 1202 he affirmed in a decretal the right of the Pope to confirm or reject the election of the Emperor and to crown the Emperor when elected according to his will. In France he espoused the cause of the injured Ingeborg, whom Philip Augustus had attempted to repudiate in order to marry Agnes of Meran. Another interposition in favor of the sanctity of the marriage tie was that by which he disciplined Alfonso IX of León, who had married within the prohibited degrees. His legates crowned the Prince of the Bulgarians and the King of Bohemia, and even the King of Armenia received the investiture of his kingdom from them. The history of his relations with England (see JOHN; LANGTON, STEPHEN) is no less noteworthy as an exhibition of the extent of his supremacy. That nothing might be wanting to the completeness of his authority throughout the then known world, the Latin conquest of Constantinople put an end to the shadowy pretensions of the Eastern rivals of his power, spiritual as well as temporal. As an ecclesiastical administrator, Innocent III holds a high place. He was a vigorous guardian of public and private morality, a steady protector of the weak against oppression, and zealous in conflict with simony and other abuses of the time. He prohibited the multiplication of religious orders by private authority, but he lent all his influence to the furtherance of the remarkable spiritual movement in which the two great mendicant orders (see Franciscans; Dominicans) had their origin. The celebrated fourth Lateran Council (q.v.), held in 1215, marked the zenith of his remarkable reign. In the following year, while busily engaged in promoting peace among the Italian cities, so as to remove obstacles to the Crusade, Innocent was seized with a fever and died at Perugia in his fifty-sixth year. His letters and decretals are in Migne, cxiv–cxviii.

Bibliography. Von Hurter, *Geschichte des Papstes Innocenz III. und seiner Zeitgenossen* (4 vols., 3d ed., Hamburg, 1841–43); Delisle, *Mémoire sur les actes d'Innocent III, suivi de l'itinéraire de ce pontife* (Paris, 1857); Gasparin, *Innocent III* (ib., 1873); Deutsch, *Papst Innocenz III. und sein Einfluss auf die Kirche* (Breslau, 1877); Brischar, *Innocenz III. und seine Zeit* (Freiburg, 1883); Lindemann, *Kritische Darstellung der Verhandlungen Innocenz III. mit den deutschen Gegenkönigen* (Magdeburg, 1885); Barry, *Papal Monarchy* (New York, 1903); Luchaire, *Innocent III* (Paris, 1904–08): Pirie-Gordon, *Innocent the Great* (London, 1907); Mann, *Lives of the Popes in the Early Middle Ages,* vols. ix, x (ib., 1914).

Innocent IV (Sinibaldo de' Fieschi, Count of Lavagna). Pope, 1243–54. He was born at Genoa, of a distinguished family, and was elected at Anagni by the cardinals who had fled from Rome, then occupied by the Emperor Frederick II. His first and most difficult task was to compose the strife which had long raged between this brilliant and vigorous prince and the holy see. Terms of peace were agreed to in 1244, the Imperial commissioner being Peter de Vinea (q.v.), afterward an antipope; but they did not agree upon the interpretation, and Frederick attempted to seize Innocent, who escaped to Genoa and thence to Lyons. To this city he summoned a general council in 1245 to deal with the questions at issue. (See Lyons, Councils of.) Innocent was unable to return to Italy until after Frederick's death, arriving in Rome in 1253. The conflict still continuing, he excommunicated the new Emperor, Conrad IV, on Maundy Thursday of 1254. Conrad died six weeks later, the power of the Ghibellines declined, and peace revisited Italy. Manfred, the natural son of Frederick, then took up arms again at the head of a Moorish army and inflicted a severe defeat on the papal forces on December 2. Five days later Innocent died at Naples. He was considered a man of great learning and did much to advance the universities of Paris and Bologna. He wrote a commentary on the Decretals of Gregory IX, which was first printed at Strassburg in 1477.

Bibliography. Masetti, *I pontefici Onorio III, Gregorio IX ed Innocente IV a fronte dell' Imperatore Frederico II* (Rome, 1884); Berger, *Les registres d'Innocent IV* (Paris, 1884); Weber, *Der Kampf zwischen Papst Innocenz IV. und Kaiser Friedrich II. bis zur Flucht des Papstes nach Lyon* (Berlin, 1900); H. K. Mann, *Lives of the Popes in the Early Middle Ages,* vols. ix, x (London, 1914). His English relations are discussed from a point of view favorable to the Church, in F. A. Gasquet, *Henry the Third and the Church* (London, 1905).

Innocent V (Pietro di Tarantasia). Pope, 1276. He was born in Savoy, entered the Dominican Order, and taught with great success in Paris. He was made Archbishop of Lyons in 1271 and Cardinal immediately afterward. His Pontificate lasted only five months, from January 21 to June 22, and was marked by endeavors to reconcile the Guelphs and Ghibellines and to reunite the Eastern churches with Rome. He left commentaries on a large part of the Bible and on the Sentences of Peter Lombard. Consult: Carboni, *De Innocentio V, Romano Pontifice* (Rome, 1894); Bryce, *Holy Roman Empire* (New York, 1911); H. K. Mann, *Lives of the Popes in the Early Middle Ages,* vols. ix, x (London, 1914).

Innocent VI (Etienne Aubert). Pope, 1352–62. He was born at Mont in the Diocese of Limoges, and elected Pope at Avignon, where he resided during his pontificate. He was a distinguished canonist and did much to reform ecclesiastical discipline. His influence was exerted for peace in many quarters of Europe, and he encouraged learning, inviting Petrarch to reside at his court. Consult: Ferdinand Gregorovius, *History of the City of Rome in the Middle Ages,* vol. vi (London, 1898); Ludwig Pastor, *History of the Popes,* vol. i (ib., 1906); *Innocent VI et Blanche de Bourbon, lettres du pape* (ed. Daumet, Paris, 1901); Bryce, *Holy Roman Empire* (New York, 1911).

Innocent VII (Cosimo de' Megliorati, a native of Salmona in the Abruzzi). Pope, 1404–06. He had distinguished himself by a knowledge of canon and civil law and by a holy life, so that he was made Cardinal in 1389 by Boniface IX, whose successor he was chosen amid the troubles of the great schism. Little else than these tumults distinguished his short reign, which was marked by nepotism. Consult: Ferdinand Gregorovius, *History of the City of Rome in the Middle Ages,* vol. vi (London, 1898); Mandell Creighton, *History of the Papacy,* vol. i (ib., 1904); Ludwig Pastor, *History of the Popes,* vol. i (ib., 1906).

Innocent VIII (Giovanni Battista Cibo). Pope, 1484–92. He came of a noble Genoese family; his father had been a Roman senator and Governor of Naples. He was a widower when he entered the clerical state and won the favor of Paul II, who appointed him Bishop of Savona, and Sixtus IV, who made him Cardinal. He strove to promote peace among Christian princes and to unite them against the Turks, who had not long before conquered Constantinople. He quarreled, however, with King Ferdinand of Naples over the payment of the customary tribute, excommunicated him, and transferred his kingdom to Charles VIII of France, whereupon Ferdinand yielded. His nepotism was marked; he gave his illegitimate son Franceschetto several towns near Rome and secured for him the hand of Maddalena, daughter of Lorenzo de' Medici. This son was born to Innocent VIII in his youth, before he began an ecclesiastical career. In compensation he made her 14-year-old brother Giovanni Cardinal and thus opened the way of the family to the papal throne. Consult: Serdonati, *Vita e fatti d' Innocenzo VIII* (Milan, 1829); Mandell Creighton, *History of the Papacy,* vol. iv (London, 1903); Ludwig Pastor, *History of the Popes,* vols. v, vii (ib., 1911).

Innocent IX (Giovanni Antonio Facchinetti). Pope, 1591. He was born at Bologna in 1519 and studied law. He was the first Bishop named by Pius IV and, after the close of the Council of Trent, was nuncio at Venice for six years. Gregory XIII made him Cardinal, and he held important offices under this Pope and his two successors, practically administering the papacy during the illness of Gregory XIV. His own reign, however, was cut short by death after two months, during which he had supported the League in France. He left a number of learned philosophical and political writings. Consult *New Schaff-Herzog Encyclopedia of Religious Knowledge*, vol. v (New York, 1909).

Innocent X (Giovanni Battista Pamfili). Pope, 1644–55. He was the candidate of the Spanish party in the conclave and thus opposed by the French. He was much influenced by his sister-in-law Olimpia Maidachini, but the insinuations of Gregorio Leti are characterized by Ranke as a baseless romance. In the bull *Zelus domus Dei* of 1648 (published in 1651) he condemned the Peace of Westphalia as injurious to the rights of the Church, and in 1653 he condemned the famous five propositions of Jansen. (See Jansenism.) On this point consult Hergenröther, *Katholische Kirche und christlicher Staat* (Freiburg, 1872), and, for his life, Ciampi, *Innocenzo X Pamfili e la sua corte* (Rome, 1878); Leopold von Ranke, *History of the Popes*, vols. ii, iii (London, 1906–12); Bryce, *Holy Roman Empire* (New York, 1911).

Innocent XI (Benedetto Odescalchi). Pope, 1676–89. He was born at Como in 1611 and named Cardinal by Innocent X in 1645. Appointed Bishop of Novara in 1650, he devoted the revenues of the see to the poor and later resigned it to his brother, taking up his residence in Rome. He was a vigorous and judicious reformer, and his reign is entirely free from the stain of nepotism. In 1679 he censured as lax 65 propositions taken from various theological works, and by the constitution *Cœlestis Pastor* of 1687 condemned still more strongly 68 propositions of Molinos (q.v.). Although he owed his election to the French party, he was soon involved in conflicts with Louis XIV, which lasted throughout his pontificate. One arose over the claim of the French Ambassador in Rome to a right of asylum, which enabled him to shelter criminals not only in his palace but in the surrounding quarter. Precipitated by an alleged attack by the Corsican guards of the Pope, it led to a military expedition being launched against the holy see. A more serious conflict arose when the Pope attempted to put an end to the abuse of the King's keeping sees vacant, in virtue of what was called the *Droit de régale,* and appropriating their revenues. The resistance to this attempt drew forth the celebrated declaration of the French clergy as to the "Gallican liberties." (See Gallican Church.) Innocent, as did Bossuet and Fénelon, disapproved of Louis XIV's methods of converting the Huguenots by force. On this point consult Gérin, "Le pape Innocent XI et la révocation de l'Edit de Nantes," in *Revue des questions historiques* (Paris, 1878); also consult, id., *Innocent XI et la révolution anglaise de 1688* (ib., 1876); Michaud, *Louis XIV et Innocent XI* (4 vols., ib., 1883); Gérin, *Louis XIV et le Saint Siège* (2 vols., ib., 1890); Immich, *Papst Innocenz XI.* (Berlin, 1900); Leopold von Ranke, *History of the Popes*, vol. ii (London, 1908).

Innocent XII (Antonio Pignatelli). Pope, 1691–1700. He was born at Naples in 1615 and, after filling important diplomatic posts, was made Cardinal by Innocent XI, whose reforming policy he set himself to imitate when raised to the papacy after a session of the conclave lasting nearly six months. He brought about a reconciliation with France, after the French bishops had retracted the "four articles," and abandoned the anti-French policy which, since Urban VIII, the popes had maintained almost without exception. Consult *Cambridge Modern History*, vol. v (Cambridge, 1908), and Leopold von Ranke, *History of the Popes*, vol. ii (London, 1908).

Innocent XIII (Michelangelo de' Conti, the son of Carlo II, Duke of Poli). Pope, 1721–24. He was born in 1655 and raised to the episcopate and the cardinalate by Clement XI. He chose his title as Pope in memory of Innocent III, who had belonged to his family. Like his predecessor, he strongly supported the Pretender, who was always recognized as James III in Rome. At the instance of the French court he very unwillingly made the Minister Dubois Cardinal, but he refused to recall the bull condemning Jansenism. Consult Mayer, *Die Papstwahl Innocenz*, vol. xiii (Vienna, 1874), and Leopold von Ranke, *History of the Popes*, vol. iii (London, 1912).

IN'NOCENTS, Holy, Feast of **(CHILDERMAS).** A festival which commemorates the massacre of the children at Bethlehem (Matt. ii. 16–18). These children are referred to as martyrs by St. Cyprian and still more explicitly by St. Augustine; and it is to them that the exquisite hymn of Prudentius, *Salvete Flores Martyrum*, is addressed. The feast is first mentioned in the *Leonine Sacramentary* (c.485). In the modern Church this feast is celebrated as a special holiday by the young, and many curious customs connected with it prevail in some countries. One of these is that in private families the children are on this day privileged to wear the clothes of the elders and in some sort to exercise authority over the household in their stead. The Greek church keeps the day on December 29 (O. S.); the Latin, December 28. In the Roman Catholic church, the color of vestments (except when the festival falls on Sunday, when red, the usual color of martyrs, is employed) is violet, the color of mourning, since the innocents died before the completion of the work of redemption.

INNOCENTS, Massacre of the. See Massacre of the Innocents.

INNOCENTS ABROAD. The best-known work of Samuel Langhorne Clemens ("Mark Twain") (1869). It is the account of a trip undertaken in 1867 by a party of Americans, who chartered the *Quaker City* and visited various countries of Europe.

INNOCEN'ZO DA IM'OLA. See Imola, Innocenzo da.

INNOM'INATE ARTERY (Lat. *arteria innominata*, artery without a name). The first large branch given off from the arch of the aorta at a distance, on the average, of 3½ inches from the aortic valve. It divides into the right carotid and the right subclavian arteries. It is separated by an interval of less than ½ inch from the left common carotid artery. Its calibre is large, and its average length is about 1½ inches. Its course corresponds to a line drawn from the middle of the sternum, or the point of junction of the manubrium and the gladiolus, to the right sternoclavicular joint. Its relations are as follows: In front, the inferior cervical cardiac branch of the right pneumogastric nerve, the left vena innominata and right inferior thyroid veins, the thymus gland, and the sternothyroid and sternohyoid muscles; behind, the trachea; on the right, the pleura, the right vena innominata, and the right pneumogastric nerve; on the left, the left carotid artery and the thymus gland. Through the innominate artery flows all the blood to the right side of the head and neck and to the right upper extremity. Unsuccessful attempts have been made to cure aneurism of the right subclavian by tying the innominate; but they have resulted only in bringing out the fact that the collateral circulation established in such cases after the operation is ample. See AORTA.

INNOMINATE BONE (Lat. *os innominatum,* bone without a name). In human anatomy, the bone which forms the hip and is provided with the socket into which the head of the femur is received. There are two of these bones in the skeleton, and each is formed by the union of the ilium, the ischium, and the pubic bone. See SKELETON.

INNSBRUCK, ĭns′brụk, in English often written INNSPRUCK. The capital and the most picturesque town of the Austrian Crownland of Tirol, situated in the Alps, at an elevation of nearly 1900 feet, on both banks of the Inn, in a region abounding in beautiful views (Map: Austria-Hungary, B 3). It lies in a broad valley, surrounded by high mountains, and has, despite its high location, a very moderate climate, the annual temperature averaging 47° F. The streets are spacious and the buildings attractive. Innsbruck comprises the old town on the right bank of the Inn and the two suburbs of Mariahilf and Sankt Nikolaus, connected with the old town by three iron bridges. In Innsbruck is found the oldest Capuchin monastery in Austria. It was begun in 1598. The Franciscan, or court, church (1553–63) is interesting. It contains a magnificent monument to Maximilian I, consisting of a bronze statue of the Emperor on a marble sixteenth-century sarcophagus, surrounded by 28 bronze statues of his ancestors and contemporaries. The sides of the sarcophagus are adorned with fine marble reliefs representing the principal events of the Emperor's life. The church possesses also a silver statue of the Virgin and several monuments to Tyrolese patriots. The Jesuit church, which is a seventeenth-century edifice in baroque style, not completed until 1902, surmounted by a dome of nearly 200 feet, and the parish church, with an altarpiece by Cranach, are worthy of mention.

The secular structures of Innsbruck are also interesting. The chief among them are a palace (about 1525), with a rich marble balcony, in late Gothic style, covered with a roof of gilded copper known as the Goldne Dachl (balcony and roof date from 1500); the Imperial palace, a rococo building of the eighteenth century, containing a spacious hall ornamented with splendid frescoes; the Ottoburg, dating from the thirteenth century; the municipal theatre; the Ferdinandeum, or Tyrolese National Museum, with a façade adorned with busts of eminent Tyrolese citizens; the new orphanage; the Triumphal Gate, erected in 1765, in honor of the reigning family; and the municipal buildings, possessing a collection of paintings and graced by the Leopoldsbrunnen in front of it. Innsbruck has a monument to Walther von der Vogelweide. First among the educational institutions is the university. It was founded in 1677 by Leopold I. It has four faculties—jurisprudence, philosophy, theology (under Jesuit control), and medicine. There are over 1300 students, 400 being theological. In 1912, the library contained 258,620 volumes. The university possesses valuable Tyrolese archives. Other prominent educational institutions are the national Gymnasium (founded in 1562), the municipal Oberrealschule, the commercial academy, and the military school. The Ferdinandeum contains, among its interesting collections, a picture gallery, and a library of about 30,000 volumes, including the works of all the Tyrolese authors. There are important hospitals. The chief industries are cotton and wool spinning, glass painting, and the manufacture of mosaics. There is a chamber of commerce. Innsbruck is the seat of the Court of Appeals for Tirol and Vorarlberg. Among the interesting features in the environs are the historic and beautiful Isel Mountain, with Natter's bronze statue to Hofer, and the famous mediæval Ambras Castle, with a celebrated collection of weapons. Pop., 1890, 23,320; 1900, 26,866; 1910, 53,194, chiefly German-speaking Roman Catholics. In ancient times the name of Innsbruck was *Œni Pons* or *Œnipontum.* The town received municipal privileges from Otho I, Duke of Meran, in 1234. From 1363, the year of the annexation of Tirol to Austria, until 1665, Innsbruck was for the most part the residence of the Tyrolese rulers of the house of Hapsburg.

INNS OF CHANCERY. Certain houses or sets of buildings in London, which were originally places of residence and study for the "clerks of the chancery," who prepared and issued the legal writs for suitors in the royal courts, and their students and apprentices; hence, also, the societies which occupied the buildings. These Inns of Chancery, which were formerly called *hospitia minora,* were formerly 8 or 10 in number and were attached to the Inns of Court, near which they were situated, from the fifteenth or sixteenth century to the eighteenth; but they now have no public function, though several of them still exist as societies, with corporate property. The chambers are occupied by solicitors and others. The last surviving Inns of Chancery were Clifford's Inn, New Inn, and Furnival's Inn. It seems that, in the fourteenth and fifteenth centuries, when the Inns of Court constituted a great legal university, the Inns of Chancery occupied the position of preparatory schools to the more dignified foundations and furnished elementary instruction in the drawing of writs and other legal papers. See INNS OF COURT.

INNS OF COURT. The four sets of buildings in London (the Inner Temple, the Middle Temple, Lincoln's Inn, and Gray's Inn) belonging to the four legal guilds or societies which have the exclusive privilege of admitting persons to practice at the bar; hence the societies themselves. The origin of the Inns of Court traces back to the mediæval inns of law, the origin of which is lost in antiquity, and their present importance is but a dim shadow of their former greatness. As early as the beginning of the fourteenth century they are known to have taken possession of the houses from which they derive their names and in the later Middle Ages they became the seat of great schools of law, to which students resorted from all parts of England, and in which scholars, statesmen, and men of affairs, as well as the leaders of the bench and bar, were trained. To-day they are little more than clubs of barristers, which maintain lectures for law students and guard their admission to the bar. The distinction of the four principal inns of law (i.e., houses where law was taught), as Inns of Court, was fully established in the fifteenth century; but in earlier times, and sometimes later, the name Inns of Court, or its equivalent, seems to have included both the *hospitia majora* of the early period and the *hospitia minora*, or lesser inns, to which the Inns of Chancery (q.v.) belonged.

The four Inns are each governed by a committee or board, called the benchers, who are generally king's counsel or senior counsel, self-chosen, i.e., each new bencher is chosen by the existing benchers. Each Inn is self-governing and quite distinct from the others, all, however, possessing equal privileges; but latterly they have joined in imposing certain educational tests for the admission of students through the medium of a council of legal education, consisting of delegates appointed by each Inn from among its benchers. It is entirely in the discretion of an Inn of Court to admit any particular person as a member, for no member of the public has an absolute right to be called to the bar, there being no mode of compelling the Inn to state its reasons for refusal. But practically no objection is ever made to the admission of any person of good character. Each Inn has also the power of disbarring its members, i.e., of withdrawing from them the right of practicing as counsel. This right has been rarely exercised, but of late years there have been examples of persons abusing their profession and indulging in dishonest practices; in such cases the Inn has its own mode of inquiring into the facts affecting the character of a member and is not bound to make public the results of its investigation. By this high controlling power over its members a higher character is supposed to be given to the bar as a body than if each individual were left to his own devices, unchecked except by the law. The buildings of each Inn consist of a large area of houses or chambers, which are in general occupied exclusively by barristers, and sometimes by attorneys, and are a source of great wealth to the societies to which they respectively belong. The buildings of the four Inns are not marked by any general plan or uniformity in grouping or style of architecture, but represent the growth of many centuries. The Inner Temple has a fine hall of the time of Elizabeth, with an open-timbered roof of much beauty; the Middle Temple has a library which is a nineteenth-century building with a roof studied from that of Westminster Hall.

Bibliography. Timothy Cunningham, *History and Antiquities of the Four Inns of Court and of the Nine Inns of Chancery* (London, 1780); R. R. Pearce, *Guide to the Inns of Court and Chancery, with Notices of their Ancient Discipline, Rules, and Customs* (ib., 1855); Alexander Pulling, *Order of the Coif* (ib., 1884); Cecil Headlam, *Inns of Court* (New York, 1909); H. Ringrose, *Inns of Court* (Chicago, 1909); W. B. Odgers (ed.), *Six Lectures on the Inns of Court and of Chancery* (New York, 1912). See BAR; BARRISTER; LEGAL EDUCATION.

INNSPRUCK. See INNSBRUCK.

INNUENDO, ĭn'ū̇-ĕn'dō̇ (Lat., by hinting). In law, a clause in a declaration for slander or libel, in which the relation or application of the alleged slanderous or libelous words to the plaintiff is pointed out and explained. This clause is necessary only if their meaning or application is ambiguous. The term is used only in jurisdictions where common-law pleading prevails. See DECLARATION; DEFAMATION; LIBEL; SLANDER.

INNUIT, ĭn'nū̇-ĭt. A name sometimes applied to the American Eskimo. See ESKIMO.

I'NO (Lat., from Gk. Ἰνώ), or LEUCO'THEA. In Greek legend, the daughter of Cadmus and Harmonia, and wife of Athamas (q.v.), who reigned in Phthiotis, or Bœotia. He had previously wedded the goddess Nephele, who bore him Phrixus and Helle (q.v.). Ino also bore two sons, Learchus and Melicertes (q.v.), and in her jealousy plotted the destruction of her stepchildren, who were rescued by their mother. As Ino had cared for the infant Dionysus, son of her sister Semele and Zeus, Hera visited Athamas with madness, and in his frenzy he killed his son Learchus. Ino, fleeing with Melicertes in her arms and pursued by her husband, leaped into the sea and was received by Poseidon and the nymphs as a new goddess under the name of Leucothea. The worship of Ino-Leucothea and her son Melicertes-Palæmon was widespread. She aided the shipwrecked Odysseus and was in general regarded as the special helper of those in extreme distress and peril at sea. The story of Athamas and Ino is used with many variations by Sophocles and other Greek dramatists and by the Roman poets Ennius and Accius in their tragedies.

IN'OCAR'PUS (Neo-Lat., from Gk. ἴς, *is*, fibre + καρπός, *karpos*, fruit), *Inocarpus edulis*. The South Sea (or Tahiti) chestnut, an important tree to the inhabitants of the South Sea Islands for its fruit, a nut, which, while green, is gathered and mashed to supply a considerable part of their food. The tree is of stately growth and fine foliage; the leaves evergreen, of delicate texture, oblong, 6 or 8 inches in length. Instead of increasing uniformly in thickness the trees throw out buttresses to support the trunk. Small projections appear on the lower branches, which later become 2 or 3 inches thick, and extend sometimes 4 feet from the trunk at the bottom in nearly straight lines from the root to the branches. They look like plank buttresses covered with bark. The central stem may continue for many years only 6 or 7 inches in diameter. These natural planks are used for paddles of canoes and for other purposes. This tree has been extensively planted throughout the tropics. At Calcutta 10-year-old trees were reported 25 to 30 feet in height.

IN'OCER'AMUS (Neo-Lat., from ἴς, *is*, fibre + κέραμος, *keramos*, tile). A characteristic fossil lamellibranch (pelecypod) of the Jurassic and Cretaceous rocks. The valves have rounded outlines, with the surfaces broken by concentric folds, beaks low, and hinge line without teeth. These shells are very abundant in the Jurassic and Cretaceous rocks of the Western States, some of them attaining the diameter of 2 feet. See JURASSIC SYSTEM.

INOC'ULA'TION (Lat. *inoculatio*, from Lat. *inoculare*, to graft, from *in*, in + *oculus*. eye). Intentional infection of an individual with a disease by introducing its virus into the tissues or fluids of the body. Inoculation of the lower animals is used in the study of bacteriology, for it is possible by this means to reproduce in animals, with some organisms, the pathological condition presented in the natural disease. Cultures are made of the microörganisms of the disease; or tissues, secretions, or excretions are obtained from the diseased body, to constitute the material for use. (See DISEASE, GERM THEORY OF.) The inoculation is either *subcutaneous, intraserous, intravascular,* or *intracerebral,* according as the injection is made respectively into the tissue under the skin, into a serous cavity like the pleura, into a vein, or directly into the substance of the brain.

Criminals have been inoculated with disease for experimental purposes, as well as volunteers for science' sake. Preventive inoculation is practiced in the case of several diseases, as rabies, plague, diphtheria, etc. Virus of disease which has become weakened (attenuated) by being passed through several animals is injected into human beings who have been or are to be exposed to the disease, and the desirable blood change, together with the development of antitoxin, is obtained. (See ANTITOXIN; IMMUNITY; SERUM THERAPY.) The first use of inoculation in human beings was probably the intentional transference of smallpox. From very ancient times the Hindus, and from as early as the sixth century the Chinese, inoculated persons with smallpox and then cared for them, with the result of a smaller mortality than if they had caught the disease during an epidemic. In 1717 Lady Mary Wortley Montagu, wife of the English Ambassador in Turkey, became convinced of the advantages of inoculation with smallpox, as practiced by the Greeks and Armenians there. In 1721 she caused her son to be inoculated in London. Six condemned criminals at Newgate were the next experimental cases; and, after the two children of Caroline, Princess of Wales, were also inoculated, the fashion became established among the wealthy and high-born. The mortality from smallpox in England at that time was one in five, while the mortality of the inoculated was but one in 3000. The Chinese used crusts, placed in the nostrils, or caused the children to wear the clothes of a smallpox patient. Following the Hindu method, the English made incisions in the arms, into which the pus from a pustule was introduced. In general, a milder course was taken by the disease resulting from inoculation, about 50 pocks appearing, it is said; but in some cases intense invasion followed with a fatal result. The disadvantage of the method appears from the fact that every inoculated person became a focus for the spread of the disease, and isolation was expensive. Besides, the percentage of deaths from smallpox, in spite of (or possibly because of) inoculation, increased till at the end of the eighteenth century one-tenth of the population of England died of the disease. After becoming very fashionable and spreading over the civilized world, inoculation fell into disrepute shortly after Jenner's introduction, in 1796, of vaccination, which he had discovered, in 1775, to be a preventive of smallpox. The entire efficiency of vaccination and its safety and ease caused its rapid supplanting of inoculation. Prussia in 1835 prohibited inoculation for smallpox, and Great Britain enacted laws against it in 1840. Inoculation is said by Plehn to be still practiced in certain parts of Central Africa, with few fatalities. It is said to be still in vogue in China and in Algiers. For many years vaccination was carried on by inoculation, the contents of the vaccinia pustules being transferred from patient to patient. Consult: Moore, *The History of Smallpox* (London, 1815); Collinson, *Smallpox and Vaccination Historically and Medically Considered* (ib., 1860); Carl Oppenheimer, *Toxins and Antitoxins* (Philadelphia, 1906); S. A. Arrhenius, *Immunochemistry* (New York, 1907); R. W. Allen, *Vaccine Therapy: Its Theory and Practice* (3d ed., Philadelphia, 1910); J. B. Citron, *Immunity* (ib., 1912); E. H. Schorer, *Vaccine and Serum Therapy* (St. Louis, 1913); H. T. Ricketts, *Infection, Immunity, and Serum Therapy in Relation to the Infectious Diseases of Man* (2d ed., Chicago, 1913). See VACCINATION; JENNER.

INOCULATION, IN PLANTS. A term rarely used in horticulture in the sense of budding (q.v.).

IN'OFFI'CIOUS TESTAMENT (ML. *inofficiosus*, contrary to duty, from Lat. *in-*, not + *officiosus*, dutiful, from *officium*, duty, from *opificium*, doing of work, from *opifex*, one who does work, from *opus*, work + *facere*, to do). In the civil law, a testament which makes no provision for the issue of the testator and assigns no reason for so doing. Such a will is deemed contrary to the duty which a parent owes to his offspring and is therefore wholly or partially void. This doctrine has been adopted into the legal systems of the Continent, of Scotland, of Louisiana, of Quebec, and of other states whose law is derived from that of Rome, but does not obtain in the common-law system of England nor in most of the United States. Where it exists it is now generally regulated and defined by statute. See HEIR; SUCCESSION; TESTAMENT. Consult the authorities referred to under CIVIL LAW.

IN'OSITE (from Gk. *ἴς, is,* fibre), or MESO-INOSITE, $C_6H_6(OH)_6 + 2H_2O$. A compound of carbon, hydrogen, and oxygen, extensively found in vegetables and sparingly in the muscles, lungs, kidneys, spleen, liver, and brain of man. It may be prepared by extracting unripe beans with water, boiling the extract with some acetic acid, filtering, adding normal lead acetate to the filtrate, again filtering, adding some ammonia and basic lead acetate to this second filtrate, separating the precipitate thus produced and dissolving it in aqueous sulphureted hydrogen, and finally mixing the sulphureted-hydrogen solution with alcohol and ether; the inosite is then obtained in crystalline form, viz., in the form of large rhombic tables. The composition ($C_6H_{12}O_6$) and the sweet taste of inosite led chemists to mistake it for a chemical relative of the ordinary sugars (carbohydrates); it has, however, been shown to be a derivative of benzene, C_6H_6, or rather of cyclohexane, C_6H_{12}. (See HYDROCARBONS, *Hydroaromatic Hydrocarbons.*) The presence of inosite in a substance submitted for examination may be detected by mixing a small amount of the given substance with a little nitric acid, evaporating to dryness in a platinum crucible, and treating the residue with ammonia and a little strontium acetate. The presence of inosite is thus revealed by the formation of a violet precipitate and a greenish coloration. Inosite does not ferment with yeast, does not (like the true sugars) reduce Fehling's solution (q.v.), and when heated with strong hydriodic acid at 170° C., it yields such products as carbolic acid and its tri-iodo derivative, and some benzene—which indicates its relationship, already mentioned, not to the true sugars, but to substances of the aromatic and hydroaromatic series. It is also much less soluble than the true sugars. When anhydrous, it melts at 225° C. (437° F.).

This "ordinary" inosite, which is sometimes called *anti-* or *meso-inosite,* is optically inactive; i.e., its solutions do not rotate the plane of polarized light. There are, however, two modifications of inosite that are optically active; these are known, respectively, as *dextro-inosite* and *levo-inosite,* the former having a specific rotatory power of + 65°, the latter of − 65°, circular. Like meso-inosite, they do not ferment with yeast, do not reduce Fehling's solution, yield carbolic-acid derivatives when heated with strong hydriodic acid, etc. Either of them melts at 247° C. (476.6° F.), and they are somewhat more readily soluble in water than meso-inosite. Neither of them has been found in nature in the uncombined state. Dextro-inosite was obtained by Maquenne by the action of hydriodic acid upon pinite—a crystalline substance contained in the resin of *Pinus lambertiana,* a species of pine growing in Oregon and Nebraska. Levo-inosite was similarly obtained from quebrachite—a substance contained in quebracho bark.

Finally, the two optically active modifications of inosite just described combine, when mixed in equal amounts, giving what is known as *racemic inosite,* a substance which melts at a higher temperature than the other modifications, viz., at 253° C. (487.4° F.), and is much less soluble in water than the others. Optically it is, of course, inactive, the optical activity of each of its components neutralizing that of the other. That, however, unlike ordinary inosite, it is made up of two distinct substances is indicated by the fact that *Aspergillus niger,* a species of fungus occurring on damp plants, attacks its two components with unequal effect, the levo-inosite being destroyed more rapidly; so that, after the action has proceeded for some time, the components are no longer present in equal amounts, the dextro-inosite is present in some excess, and the substance as a whole rotates the plane of polarized light to the right. See STEREO-CHEMISTRY.

INOUYE, ē'nō-o͞o'yā', KAORU (1835–1908). A Japanese statesman, born in Choshu. With his friend Ito (q.v.) he went to Europe in 1863 and studied in London. He returned in time to prevent his clansmen from fighting the allied squadrons at Shimonoseki (q.v.) in 1864. His progressive spirit and loyalty to the Emperor drew upon him the wrath of reactionary assassins, who wounded him with their swords and left him for dead on the snow. He recovered, however, and subsequently was made Vice Minister of the Treasury in Tokyo, in which position he was influential in having the chief thoroughfare of the city rebuilt in brick after the great fire of 1872. He was made Minister of Public Works in 1878 and of Foreign Affairs in 1881. After holding this office for seven years, he became Minister of Commerce and Industry, in 1892 Minister of the Interior, and in 1898 Minister of Finance. In 1884 he was made Count. After the war with China he went to Korea to inaugurate reforms, but his programme was marred by the assassination of Queen Min. He belongs to the group of elder statesmen whose influence was apparent during the war with Russia in 1904–05. Consult Arthur Lloyd, *Every-Day Japan* (New York, 1911).

INOWRAZLAW, ē'nō-vrāts'lāf. A town in the Prussian Province of Posen, situated 21 miles southwest of Thorn (Map: Germany, H 2). It has ruins of an eleventh-century church, a Kurhaus, a Gymnasium, and manufactures ironwork, machinery, sugar, flour, chicory, and bricks. It is a good market for cattle and finely bred horses. In the vicinity of the town are situated extensive government salt works. Pop., 1900, 26,141.

IN PAR'TIBUS IN'FIDE'LIUM. See TITULAR BISHOPS.

IN PERSO'NAM (Lat., against a person). In the classification of legal rights, a right in personam is one available against a particular person as distinguished from one maintainable against the whole world, known as a right in rem (q.v.). Rights in personam arise out of specific engagements entered into by individuals or out of duties imposed on individuals by the policy of the law. They thus comprehend all contract rights, the rights that arise out of the domestic relations or out of fiduciary or official position. Thus, the right to the performance of a contract, the right of a husband to the society of his wife, the right of a beneficiary against a trustee, in each case asserted against a determinate person, are all rights in personam. But by far the largest class of these rights is that which springs from the violation of other rights, whether rights in rem or in personam. A right once violated—whether a right of property by a trespass, or the right of personal security by an assault, or a contract right by a breach of contract—a cause, or right, of action arises, and this right of action, being limited to the person or persons committing the act complained of, is necessarily a right in personam. See IN REM; RIGHT; and consult Holland, *Elements of Jurisprudence.*

The phrase "in personam" is also employed in a narrower sense to describe the nature of the jurisdiction exercised by a court. The courts of chancery are said to act in personam, i.e., by ordering a person to do or to refrain from doing a certain thing, while courts of law, whose function is not to command, but to adjudicate controversies, are said to act in rem. See CHANCELLOR; CHANCERY, COURT OF; EQUITY.

IN'QUEST (OF. *enqueste,* Fr. *enquête,* from LL. *inquista,* from Lat. *inquisita,* p.p. fem. sing. of *inquirere,* to inquire, from *in,* in + *quærere,* to search). In early English law, a body of "lawful" men (*legali homines*) summoned and sworn to inquire into matters of fact of which the authorities desired cognizance and to report thereon under oath. Later the proceeding itself came to be known as an inquest, and this is the modern sense of the term. The process is one of great antiquity and was freely employed by the Norman and Angevin kings in England for a great variety of purposes, administrative as well as judicial. Domesday Book is the record of numerous inquests conducted by the Conqueror for the benefit of the royal exchequer. The chief interest of the inquest for modern lawyers lies in the fact that it is the direct progenitor both of trial by jury and of the inquiry into crimes and other matters which is the present function of the grand jury.

Specifically the inquest is still employed in English and American law under that name in three classes of cases, all of them survivals from the period to which reference has been made. These are (1) the coroner's inquest, (2) the sheriff's inquest, and (3) inquest of office.

1. *The coroner's inquest* is an investigation conducted by the ancient official known as a coroner (so called because his original function was to maintain pleas of the crown, *placita coronæ*) into the cause or manner of death of any person who has been slain, has died suddenly, is found dead, or has died in prison. Where foul play is suspected, the inquest may develop into a quasi-judicial investigation into the culpability of the suspected person and may result in a finding which charges him with the homicide; but, as the proceeding is not strictly judicial nor in any sense a trial of the accused, the latter is not entitled to make a defense or be heard in his own behalf. In some of the American States the office of coroner has been abolished and a medical inspector substituted, but the procedure remains substantially the same. The jury in a coroner's inquest is known as a coroner's jury.

2. *The sheriff's inquest* is an inquiry conducted by the sheriff of a county and a jury to ascertain the amount of damages due a plaintiff under a judgment against a defendant in default. When a defendant fails to appear or answer in a cause, the plaintiff is entitled to judgment without proving his cause of action, which is deemed admitted by the defendant's default. But as he is, under his judgment, entitled only to the damages actually sustained by him, it is the practice in such cases for the court to direct an inquest for the purpose of ascertaining the amount. As the proceeding in the inquest is not a trial of the issue between the parties, no evidence need or can be given thereon, but the hearing will be confined to the precise question of the damages sustained by the plaintiff—a fact which must be determined in order that he may have execution. The defendant may be heard on this, as well as the plaintiff, and may summon witnesses to testify in his behalf. The practice still prevails in the United States as well as in England, but in New York and some other States the proceeding, still known as an inquest, is taken in court before any jury that may be in attendance. The sheriff's inquest is also employed in cases of attachment of goods, replevin, or garnishment, to determine which of two or more claimants is entitled to the possession of the property in controversy.

3. *Inquest of office* is an inquiry, now usually directed by the Attorney-General, to ascertain whether or not the crown, or state, is entitled to lands by escheat or to lands or goods by forfeiture. As the right of the state in such a case depends on certain facts, as the death of a landowner without heirs or, formerly, the conviction of a property owner of treason or felony, the duty of the inquest is to ascertain and report on these facts. As the proceeding is in England strictly a plea of the crown, the function of holding the inquest formerly belonged to the coroner. It is now in the United States generally exercised by a commissioner or other officer designated for the purpose by the chief law officer of the State. The procedure is also known as "office found" (q.v.).

In States where aliens are, as at common law, forbidden to acquire real estate, inquest of office is the appropriate process for ascertaining the facts on which the right of the State to take the property depends.

Consult: Blackstone's *Commentaries on the Laws of England;* Kent, *Commentaries on American Law* (13th ed., 4 vols., Boston, 1884); Thayer, *Preliminary Treatise on Evidence* (ib., 1898); Pollock and Maitland, *History of English Law* (2d ed., Cambridge, 1899); Holdsworth, *History of English Law* (4 vols., Boston, 1908–09). See CORONER; JURY; INQUISITION.

INQUILINE, ĭn′kwĭ-lĭn (from Lat. *inquilinus*, one dwelling in a place not one's own, from *incola*, inhabitant, from *incolere*, to inhabit, from *in*, in + *colere*, to cultivate). An insect which lays its eggs in a nest of some other insect, thus living parasitically at the expense of the host. The Inquilinæ form a group of gallflies called "guest gallflies," which are unable to produce galls themselves, since they do not secrete the gall-producing poison, though possessing a well-developed ovipositor. Hence, like the *Nomada*, etc., among bees, they are "cuckoo flies," laying their eggs in galls already formed, the larvæ feeding on the inside of the gall in company with the larvæ of their host. These inquilines strikingly resemble their hosts and are difficult to separate. There are several hundred species. The Inquilinæ, forming a section of the family Cynipidæ, are, according to Walsh, distinguished from the true gallflies by the sheaths of the ovipositor always projecting more or less beyond the "dorsal valve," which is a small hairy tubercle at the top of the seventh abdominal segment. This dorsal valve also projects greatly. In almost all the species the ovipositor projects from between the tips of the sheaths. Among the inquiline genera are *Synophrus*, *Amblynopus*, *Synerges*, and *Aulax*, which are "guests" of various species of Cynipides. The cuckoo flies (Chrysididæ) are all inquilines, laying their eggs in the nests of wasps and solitary bees; some are true parasites.

One of the eight species of British wasps is said by Sharp to be a guest wasp. Guest bees are not rare; they do not work, the organs for collecting and carrying pollen having been lost by disuse. Guest bees enter the nests of both solitary and social bees and lay their eggs, the young feeding upon the pollen stored up for the young of their hosts, but not directly destroying their young hosts. *Nomada* (q.v.) is a gayly colored bee which boards with species of *Halictus*, *Andrena*, etc. Packard states that there seemed enough food in the nest for the young of both host and boarder, as they were found to live harmoniously together, and their hosts and their parasites are disclosed both at the same time. The species of *Cœlioxys* live on the leaf-cutting bee (*Megachile*), those of *Psithyrus* on the bumblebee. In this guest bee the mandibles of the female are acute and two-toothed, their legs (tibiæ) are convex, so that they cannot carry pollen, while they have no pollinigerous organs. The habits of these guest bees afford interesting examples of the effect of change of habits on their structure. For the guests of ants and termites, see INSECT, *Social Insects*.

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INQUI′RY, COURT OF. See COURTS, MILITARY.

INQUIRY, WRIT OF. A common-law writ

or process issuing out of a court directed to a sheriff commanding him to empanel a jury for the purpose of assessing damages against a defaulting defendant. The proceedings under such a writ are termed an inquest. See INQUEST.

IN'QUISI'TION (Lat. *inquisitio*, inquiry, from *inquirere*, to investigate, from *in*, in + *quærere*, to seek), THE (*Inquisitio hæreticæ pravitatis*), called also the Holy Office. A tribunal in the Roman Catholic church for the discovery, repression, and punishment of heresy, unbelief, and other offenses against religion. The punishment of heresy by force arose after the Roman Empire became officially Christian. Soon after the Council of Nicæa (325) had formulated its creed Constantine attempted to repress all dissent, but it was not until 385 that any one was executed for heresy. (See HERESY.) From this time, in the East, persistence in heresy was legally punishable with death. In the West, however, among the more tolerant Teutonic tribes there was no tendency for several centuries to inflict the capital sentence for heresy. In the twelfth century there were some executions, but the Western church in general preferred milder measures. The ecclesiastical cognizance of heresy, and its punishment by spiritual censures, belonged to the bishop or episcopal synod; but the bishops seldom fulfilled this duty, because they were too fully occupied. No special machinery for the purpose was devised, however, until the spread, in the twelfth and thirteenth centuries, of certain sects reputed dangerous alike to the state and to the church—the Cathari, Waldenses, and Albigenses—excited the alarm of the civil as well as of the ecclesiastical authorities. At that time heresy was regarded as a crime against the state no less than against the church. An extraordinary commission was sent by Pope Innocent III into the south of France to aid the local authorities in checking the spread of the Albigensian heresy, and a council held at Avignon in 1209 directed that in each parish the priest and two or three laymen in good repute should be appointed to examine and report to the bishop all such offenses discovered within the district. The fourth Lateran Council (1215) earnestly impressed, both on bishops and magistrates, the necessity of increased vigilance against heresy.

So far, however, there was no permanent court distinct from those of the bishops; but by successive edicts, from 1227 on, a special tribunal for the purpose was instituted, the direction of which was confided chiefly to members of the Dominican Order (1232). The Inquisition thus constituted became a general instead of, as previously, a local tribunal; and it was introduced into Italy, Spain, and the southern provinces of France.

The procedure of the Inquisition deserves a brief notice. A person suspected of heresy or denounced as guilty was liable to be arrested and detained in prison, to be brought to trial only when it might seem fitting to his judges. The proceedings were conducted secretly. He was not confronted with his accusers, nor were their names even then revealed to him, but the suspect could make known his enemies, whose evidence would thereupon be excluded. The evidence of an accomplice was admissible, and the accused himself was liable to be put to the torture in order to extort a confession of guilt. Any such confession, however, had to be repeated afterward without torture in order to be accepted; but if the accused refused to repeat his confession he might be tortured again. As a punishment, the condemned were sentenced to make pilgrimages, to wear signs of infamy such as the yellow cross, or to imprisonment, and in extreme cases were condemned to death. This extreme penalty, however, could be inflicted only by the state, and out of 636 persons condemned between 1308 and 1322 only 40 were turned over to the state for this purpose. The state was required to enforce the laws of the church as a part of the ruler's duty as a Christian. If the ruler refused, he might be excommunicated or in extreme instances deposed. The Papal Inquisition had no standing in England and the northern countries, where all such matters were attended to either by the Bishops' Inquisition or, as in England, by the royal power. In Languedoc the Inquisition was very active for about a century, but by the end of the first quarter of the fourteenth century it had practically spent its force. In northern France the history of the Inquisition is more obscure, but by the end of the fourteenth century it is certain that it was decadent. Philip the Fair, however, made use of the Inquisition against the Templars and in 1312 made it a state tribunal. In most of the Italian cities except Venice it was very powerful. In Germany it had very slight influence.

It was in Spain, Portugal, and their dependencies that the Inquisition attained its fullest development. As an ordinary tribunal similar to those of other countries, it had existed in Spain from an early period. In 1237 the duties of the Inquisition were given to the Dominicans and Franciscans. Early in the reign of Ferdinand and Isabella, in consequence, it is said, of the alarms created by the alleged discovery of a plot among the Jews and the Jewish converts —who had been required either to emigrate or to conform to Christianity—to overthrow the government, an application was made to Pope Sixtus IV to permit its reorganization (1478); but in reviving the tribunal the crown assumed to itself the right of appointing the inquisitors and, in fact, of controlling the entire action of the tribunal. The establishment of the tribunal of the Inquisition was sanctioned by the Cortes at Toledo in 1480, and from this date the Spanish Inquisition became a state tribunal. In order to prove that the church generally, and the Roman see itself, was dissociated from that state tribunal, the bulls of Pope Sixtus IV, which protest against it, are cited. Notwithstanding this protest, however, the Spanish crown maintained its control of the Inquisition. The work of the Inquisition began in 1481, when Miguel Morello and Juan Martín, members of the Dominican Order, were appointed inquisitors for Seville. In 1483 the Inquisition was extended over Aragon and León, and the Dominican Tomás de Torquemada (q.v.) became the first Grand Inquisitor. The Inquisition asserted an independence not pleasing to Rome, and when Spain sought to introduce it into Naples also, Pope Paul III, in 1546, exhorted the Neapolitans to resist its introduction. However severe the weight of the Inquisition may have been on heretics and unbelievers, the number of its victims as given by Llorente, the antipapal historian of the Inquisition, is enormously exaggerated. His statements deserve no credence whatever, although he had excellent opportunities of learning the truth, as he was for a time the secretary of the Inquisition. He was a violent partisan, and his errors and exaggerations have been exposed, especially by Hefele in his *Life of Cardinal Ximenes* (Eng. trans., 2d ed., London, 1885); Ranke does not hesitate, in his *Fürsten und Völker des südlichen Europas* (4th ed., Leipzig), to impeach his honesty. While Llorente gives the number of executions as 341,042, the Catholic authority Gams states 4000 to have been the total. Protestant writers have usually given figures varying between the lowest and the highest. Charles V (1516–56) and Philip II (1556–98) made attempts to transfer the Inquisition also to the Netherlands, but there is no question that here its object was political, intended to suppress a revolt rather than a heresy.

The Spanish Inquisition is condemned by Protestants and non-Spanish Catholics alike. Spanish Catholics, however, are inclined to defend it and hold that its form of proceeding was not as usually stated, but was fair and equitable, considering what a fearful crime heresy was and is in the eyes of the Catholic church. There is no doubt, moreover, that many of the crimes tried by the inquisitors in Spain were such as would now be brought into our ordinary civil courts.

The rigor of the Spanish Inquisition abated in the latter part of the seventeenth century. In the reign of Charles III it was forbidden to punish capitally without the royal warrant, and in 1770 the royal authority was required as a condition even for an arrest. In 1808, under King Joseph Bonaparte, the Inquisition was suppressed. It was revived under the Restoration, was again suppressed on the establishment of the constitution in 1820, but was partially restored in 1825, nor was it till 1834 that it was finally abolished in Spain, its property being applied two years later to the liquidation of the national debt.

From Spain the Inquisition was transplanted into all the Spanish-American countries, and it continued to exist in these countries until they became independent. From Portugal the Inquisition was extended to the Portuguese colonies in India. The rigor of its process, however, was much mitigated in the eighteenth century, and under John VI it fell entirely into disuse.

The Inquisition in Rome and the Papal States never ceased, from the time of its establishment, to exercise a severe and watchful control over heresy, or the suspicion of heresy, which offense was punished by imprisonment and civil disabilities; but of capital sentences for heresy the history of the Roman Inquisition presents few instances, and according to Balmes, *On Civilization* (6th ed., Madrid, 1875), that tribunal "has never been known to order the execution of a capital sentence" for the crime of heresy. The tribunal still exists under the direction of a congregation (*congregatio sancti officii*), originally founded by Paul III in 1542 and reorganized by Sixtus V, but as by its very constitution it must call upon the state aid to enforce its decrees, and as such state aid can nowhere be obtained at the present day, its action is limited to the imposition of spiritual punishments, such as excommunication.

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INQUISITION. The formal instrument in writing setting forth the verdict or decision of a sheriff's or coroner's jury as a result of their inquiry into the facts of the matter referred to them. It is certified and signed by each of the jurors and is usually required to be filed in some public office as a record of the inquest. It does not operate as a judgment, but is sometimes the basis of further proceedings in the matter. For example, if a coroner's jury summoned to inquire into the cause of the death of A find that he was killed by B under circumstances not justifiable by law, the proper authorities will cause the latter to be indicted. The inquisition is not evidence against him, being merely for the information of the public prosecutor.

The word is less frequently used to describe the proceedings at an inquest, but this leads to confusion and is not sanctioned by the best authorities. See INQUEST.

IN REM (Lat., in, or with respect to, a thing). In the classification of legal rights, a right in rem is a right of a general character, available against the whole world, as distinguished from a right in personam, which is a right against a determinate person (*in personam certam*). Rights in rem are not limited to things, i.e., to property, as the phrase might indicate, but comprehend all rights, whether in respect to person or property, which are claimed or asserted against all persons whatsoever, and not against any particular individual. Thus, the right not to be assaulted, the right to personal liberty and security, are rights in rem, as well as the right to be free from invasion of a property right. See IN PERSONAM.

The expression is also employed to designate a form of action in which the remedy sought is not damages against an individual, but the seizure and detention of specific articles. In such cases the thing sought to be recovered or charged with the claim of the plaintiff is personified for the purpose of making it the defendant in the action. Such proceedings are not common in our legal system, the ordinary process for the recovery of land or goods being really an action in personam against the person wrongfully withholding the property. But in admiralty practice such actions are common. They are brought for the enforcement of maritime liens against a vessel or cargo, for the recovery of salvage, to procure the forfeiture of property for a violation of the revenue laws, or to obtain possession of a prize in time of war. See MARITIME LAW.

I. N. R. I. The first letters of the Latin inscription placed on the cross by Pilate at the crucifixion of Christ: *Iesus Nazarenus Rex Iudæorum*, 'Jesus of Nazareth, the King of the Jews' (John xix. 19).

INSANE ASYLUM. An institution for the care and treatment of the insane. Monasteries appear to have been the representative of such retreats in the mediæval Christian times, but restraint and rigid asceticism characterized their management. Out of conventual establishments grew the bethlems, or bedlams, with which the English of two generations ago were familiar. (See BEDLAM.) The vast majority of the insane must have been neglected; in some countries, reverenced as specially God-stricken; in others, tolerated or tormented or laughed at as simpletons or buffoons; in others, imprisoned as social pests, even executed as criminals. In a few spots, enjoying a reputation for sanctity, or where miraculous cures of nervous diseases were supposed to have been effected, such as Gheel (q.v.) and Saint-Suaire, communities were formed, of which lunatics, sent with a view to restoration, formed a large part, and resided in the houses of the peasants and partook of their labor and enjoyments. Asylums, properly so called, date from the commencement of the nineteenth century; and for many years after their institution, although based upon sound and benevolent views, they resembled jails, both in construction and the mode in which they were conducted, rather than hospitals. Until about 1880 a model erection of this kind was conceived necessarily to consist of one vast building, the centre of which was appropriated to the residence of the officers, the kitchen and its dependencies, the chapel, etc., from which there radiated long galleries, in which small rooms, or cells, were arranged upon one or both sides of a corridor or balcony, having at one extremity public rooms, in which the agitated or nonindustrial inmates, as the case might be, spent the day, while the more tractable individuals were withdrawn to engage in some pursuit, either in workshops, clustered round the central house, or in the grounds attached, which were surrounded by high walls. The population of such establishments, when they were appropriated to paupers, ranged from 100 to 1400 patients. These were committed to a staff composed of a medical officer, matron, and attendants, to whom were directly intrusted the management, discipline, and occupation of the insane, in accordance with regulations or prescriptions issued by the physician. A gradual but great revolution has taken place in the views of psychologists as to the provisions and requirements for the insane during seclusion, chiefly through Conolly's influence, in 1847 and subsequently. As a result of this change, asylums, especially for the wealthy classes, are similar in their arrangements to ordinary dwelling houses; while it is proposed to place the indigent in cottages in the immediate vicinity of an infirmary, where acute cases, individuals dangerous to themselves or others, or in any way untrustworthy, can be confined and actively treated, as their condition may require. In all such establishments, whether now entitled to be regarded as cottage asylums or not, the semblance and much of the reality of coercion have been abolished; the influence of religion, occupation, education, recreation, the judicious application of moral impressions, and the dominion of rational kindness and discriminating discipline, have been added to mere medical treatment, and substituted for brute force, terror, and cruelty. In fact, the word "asylum" has been supplanted by "hospital"; "keepers" have given place to "nurses" and "attendants"; and the insane are treated, especially in institutions in the United States, as sick people.

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INSAN'ITY (Lat. *insanitas*, from *insanus*, insane, unsound, from *in-*, not + *sanus*, sane, sound; connected with Gk. *σάος*, *saos*, *σῶς*, *sōs*, sound, safe), or LUNACY. A manifestation of disease of the brain characterized by a general or partial derangement of one or more of the mental processes, in which, while consciousness is not abolished, mental activity is weakened or perverted. This definition is modified from that given by Hammond and, like all attempted definitions of the term, is inadequate. Insanity is not mental disorder, although disorder of mind is always present in insanity. A person who mistakes red for gray has disordered mentality; but he is not insane, though color-blind. Defective reasoning, which leads a man, e.g., into a bad investment, is a disordered mental process, yet not insanity. Thus, it is a matter of extreme difficulty to define insanity so as not to include the conditions existing in sleep, or trance, or the common manifestations of general neuroses like epilepsy, hysteria, and chorea, the delirium of fever, acute intoxications, etc. There is no rigid line of demarcation between sanity and insanity. The conditions of each bear close resemblance. The processes of mental action in sanity and in insanity are of the same kind, although they differ in their origin and in the degree of their intensity. It is often said that every one is more or less insane. This is an absurdity, as insanity is a manifestation of disease, not merely a name for mental disorder. The notion, also, that one may be insane on one subject and otherwise perfectly sane is erroneous for the same reason. An insane person may betray his mental condition when drawn out by one line of thought, or when one topic is broached; but, if insane, he is diseased and in no respect sane, even if able to carry on his business or perform complex acts properly.

To understand insanity one must understand the normal action of the mind and have some knowledge of the physical basis of mental action, i.e., of the cerebral cortex and its association fibres. (See NERVOUS SYSTEM.) The functions of the cerebral cortex are: (1) to receive impressions from the organs of sensation (conscious perceptions); (2) to group these impressions into a unit, known as a concept; (3) to store up these concepts, for future recognition and recollection (memory), for gathering into novel combinations (imagination), and for use as a basis of thought; (4) to express thought in speech and action; (5) to experience emotion which accompanies mental activity; (6) to exert self-control over all mental action (Starr). This statement is true enough for the practical study of insanity and is made to avoid opening the subject of the connection between nervous and mental phenomena. While many alienists accept the anatomical basis and believe in a transference of the mental into the material, others claim that the activity of the highest nervous centres is attended by a mental state, but is not in itself a mental state. (See MIND.) At all events, when areas of the cortex are diseased, one or more of the cortical functions named may be suspended, and mental disorder results. If changes in blood supply or in nutrition occur, or if disease affects the entire cortex, insanity may result; and, as a result, thought becomes illogical, emotion becomes excessive or arises without external stimulus, action is irregular or purposeless, and conduct is not properly adjusted to surrounding circumstances. In the insane person impressions from sense perceptions may be wrongly interpreted. An illusion is a falsely interpreted sense perception. For example, a chair may be mistaken for an animal; the rumble of a wagon may be mistaken for the angry voices of a pursuing mob. Ideas may arise without any sense perception. When quiet exists, the insane person may hear voices; he may see faces in an empty space; he may smell burning flesh when no odor is present. These false perceptions without external origin in sensory experiences are called hallucinations. A mistaken idea may be harbored by any one; e.g., one may believe that a stone is much larger than it is. Measurement and examination convince him of his error, and, if he is sane, he corrects his judgment. The insane man is not affected by logical methods and retains his erroneous idea in spite of demonstration and reasoning. A mistaken idea accepted without logical foundation is a delusion; if retained in spite of demonstration of its falsity, it is an insane delusion. Insane people frequently, though not necessarily, exhibit delusions, varying according to the bodily ills, the occupation or profession, the emotions experienced, or their surroundings. Certain forms of delusion are fairly constant in certain types of insanity. For example, in the depressed type of manic-depressive insanity or in involutional melancholia patients often declare that they have committed some great sin; in paranoia, delusions of persecution and of conspiracy are present; in manic states, delusions of identity or of being an important person are frequent; in alcoholic insanity the delusion of marital infidelity is common; in general paresis a number of grandiose delusions—of power, of wealth, of strength, of beauty—are present in one stage; and in early stages of dementia delusions of grandeur are also noticed, with less frequency. *Disturbances of emotional feeling* occur in insane people: depression, exaltation, languor, and absurd joy are noticed in different cases. Acting under the impulse of delusion or hallucination, the insane exhibit *disturbance in voluntary action and conduct*. Insufficient motive causes action, because of impaired intellectual power or impaired memory or subconsciousness. *Consciousness is impaired;* external objects are often ignored; changes of personality occur.

Besides these mental signs of insanity, there are many somatic, or physical, symptoms. These are generally divided into five classes: 1. Sensory symptoms, such as pain, hyperæsthesia (q.v.), or anæsthesia (q.v.). 2. Changes in reflex action, from disease or other cause, such as lessened knee jerk (q.v.) or dilated pupils. 3. Motor disturbances, such as loss of muscular control, shown in altered handwriting, altered speech, gait, attitude, etc.; convulsions or paralysis may also occur. 4. Changes in circulation and nutrition, such as pallor or flushing, loss of flesh, impaired digestion. 5. Disturbances of sleep, which occur commonly.

The study of disease affecting the mind is called psychiatry, less often (in Great Britain) mediopsychology. The specialists who give their attention to insanity and the treatment of the insane are called alienists.

An accurate classification of diseases affecting the mind is difficult. Various alienists have produced different tables, but very convenient is the classification of White of Washington, D. C., as follows:

1. **Paranoia and Paranoid States,** characterized by systematized delusions of persecutions and conspiracy or by extreme jealousy, usually with hallucinations of hearing, and evincing little intellectual impairment for years. See PARANOIA.

2. **Manic-Depressive Insanity,** including the old *mania* (characterized by an exalted emotional state, with psychomotor excitement and great flight of ideas), the old *melancholia* (characterized by a depressed emotional state, difficulty of thinking, psychomotor retardation), *hypomania* (a mild form of maniacal excitement, characterized by a disorder in the process of thinking, over activity, tiresome intenseness, good humor, increased self-esteem, occasional great aversion or impulsive anger), and *circular* insanity (alternating depression and exaltation).

3. **Paresis.** An organic disease of the brain with inflammatory and degenerative changes, caused by syphilis (often innocently acquired), involving both the brain and its coverings, and characterized by progressive mental deterioration. The patient often manifests "delusions of grandeur," as of great strength (although tottering and feeble), of great mental ability, or great wealth. Speech defects, lapses of memory, convulsions, hypochondriacal ideas, ataxia, occur during different stages. (See PARESIS.) The disorder is called progressive general paralysis of the brain, paretic dementia, and popularly, though incorrectly, "softening of the brain."

4. **Dementia præcox.** A disorder of adolescence or youth, resembling the dementia of the aged, and tending to progress to a hopeless terminal state, though often characterized by remissions. It often results from a hereditary factor, such as alcoholism, tuberculosis, age, or neurasthenia in the parent, or may be caused by sexual excess, excessive study, a sexual episode followed by intense worry, fright, or protracted or severe emotional strain. It may therefore be due to faulty mental hygiene and be of purely psychic origin. Failure of voluntary attention and lack of interest are early observed, orientation is preserved for a long time; but emotional deterioration is characteristic, and appears early in the case. After a precocious childhood the patient shows a shallowness, with fantastic delusions, making absurd statements often with marked incoherence. Emaciation, loss of appetite, and insomnia are common, and the parents may notice rapid heart action and blueness of the extremities. Hysteriform attacks frequently occur. Four forms of dementia præcox are observed, and there may be a fifth variety consisting of mixed forms. In one form, the catatonic, the patient presents at times rigidity and muscular tension, holding a limb for a considerable time in whatever position it is placed by the physician. In this

variety of case there is frequently a negativism, and senseless rhyming or repetition characterizes the patient's speech.

The course of dementia præcox is chronic, and the tendency is toward a deep dementia. The condition is usually permanent, but some of the cases have remissions lasting for years.

5. **Involutional Melancholia** occurs in women between the ages of 40 and 50, and in men usually after 50, being a psychosis of the involutionary period or climacteric. Commencing senile decay and arteriosclerosis are exhibited by most of the patients. Shock or other mental stress seems to be the precipitating factor in these instances. Heredity is a factor in about 60 per cent of the cases (White). This condition is characterized by deep depression, apprehension, and anxiety, often with agitation and confusion, and delusions of a hypochondriacal variety. Grandiose ideas are rare and appear late, if ever, in the course of the psychosis. Persecution, poverty, sinfulness, are the burden of the delusional thought for the most part. Constant vigilance is necessary to prevent suicide. The recoverable cases usually change for the better after three years of suffering, and these constitute about 40 per cent of the whole number.

6. **Senile Psychoses.** Virchow's aphorism, "A man is as old as his arteries," is very pertinent in the formation of a judgment of senility. A patient suffering from senile psychosis will exhibit vertigo, depression, anxiety, followed by gloom, moroseness, and seclusiveness, and later hypochondriacal delusions or persecutory ideas, irritability, lack of judgment, loss of memory, egotism, and a decided failure of the normal mental grasp. A corresponding physical change occurs. Persons suffering from this disorder frequently lose their way in familiar streets, attempt to will away property they do not own, contemplate new matrimonial alliances while the marital partner is still living, and often prowl about at night, attempting violence of various kinds. They do not improve and often demand custodial care.

7. **Infection-Exhaustion Psychoses** occur most frequently in parturient women or in postfebrile conditions. Delirium, confusion, hallucination of vision, and great fatigue characterize the cases. Where they are caused by prolonged anxiety, loss of blood, or severe mental shock, they may present collapse or a great degree of excitement with disorientation, incoherence, and finally stupor. About half of the cases recover.

8. **Toxic Psychoses.** This group consists of insanities caused either by poisons formed within the body (autotoxins) or by poisons introduced from without. The autotoxic condition may be caused by absorption of altered renal secretions or of poisons formed during diabetes, or by gastro-intestinal disturbances or thyroid disease, or may be due to alcohol, opium, cocaine, paraldehyde, iodoform, lead, etc. Of these, alcoholic insanity is by far the most frequent. It is characterized by flight of ideas, loss of propriety, lessened power of voluntary attention, thick speech, altered sight, and hallucinations of vision, with boisterousness or depression, if it be the psychosis known as *drunkenness*. If it be a chronic condition resulting from repeated inebriety, there may be added to the foregoing symptoms suspicions of marital infidelity, ataxia, muscular weakness, and mental enfeeblement, with possibly convulsions, possibly aural and visual hallucinations and persecutory delusions, far less often an amnesic state lasting many days. Of all insane men, about 30 per cent owe their insanity to alcohol, many to so-called "moderate" drinking. In a series of 960 patients in Manhattan State Hospital, Wards Island, New York City, whose entire history was well known, in 55 per cent of the men and 22 per cent of the women alcohol was beyond a doubt the precipitating cause.

9. **Psychoses Associated with Other Diseases.** This group includes phenomena that sometimes are found in hysteria, deliria, dream states (as in alcoholism), depressions and phobias of certain types of neurasthenia (a psychoneurosis), epilepsy, multiple sclerosis, chorea, syphilis, arteriosclerosis with brain softening, or mental states following injuries.

10. **Borderland and Episodic States.** This group is made up of obsessions, impulses, tics, phobias, delirium of contact, as Janet classifies them, and due to *lowering of the psychological tension*, to use his expression. Psychasthenia belongs here; likewise the periodical morbid desires known as dipsomania (q.v.), pyromania (q.v.), kleptomania (q.v.), and arithmomania, as well as the *formes frustres* of paranoia, whose component units are called "cranks"; and finally the varieties of sexual anomalies, including sexual inversion (instinctive desire for the same sex) and sexual perversion (abnormal gratification of sexual desire).

It will be seen that perversion of the will is present in almost every case of insanity. This fact led Hammond to incorporate in his definition of the term the statement that in insanity "mental freedom is weakened, perverted, or destroyed." Free determination of the will is presented by delusions, by inferences from delusions, by abnormal emotional states, by delirium, by incoherence of ideas, or by dementia. Often the mental processes of the insane are identical with those of the sane, but the premise from which the argument springs is false. In many forms of insanity the ego is preëminent. A lunatic may consider himself powerfully equipped, mentally and physically. He is expansive, elated, extravagant, arrogant, and garrulous. His condition is termed *hyperbulia*. Another may be depressed, dejected, apathetic, mentally slow and impeded, hopeless, and even suicidal. This condition is termed *abulia*. Fanciful subdivisions of the divisions of the older nomenclature have been made by some alienists, founded upon certain trains of thought or often recurring ideas, and terms have been devised to indicate the trend of imagination in patients experiencing these ideas. For example, *agoraphobia* denotes fear of being in an open place or street; *claustrophobia*, fear of being shut in a room or house; *mysophobia*, fear of defilement, pollution, or contamination; *pyrophobia*, fear of fire; *astraphobia*, fear of lightning; *anthropophobia*, fear of society. This list might be prolonged indefinitely.

Causes. The causes of insanity other than heredity, among 6061 first admissions, as ascertained in New York State by a complete and painstaking system of securing facts, were reported as follows for the year ending Sept. 30, 1913, by Dr. James V. May, medical member of the New York State Hospital Commission: alcohol, 15.2 per cent; syphilis, 14.8 per cent; drugs, 0.8 per cent; arteriosclerosis, 12.1 per cent; senility, 10.6 per cent; inferior or defective constitution, 18.5 per cent; injury to head, 1.6 per cent; acute illnesses, 1.0 per cent; epilepsy, 2.8 per cent; sexual irregularities or difficulties, 3 per cent; death in family, 2.1 per cent; financial loss, 2.2 per cent; disappointment in love, 1.4 per cent; and childbirth, 3.3 per cent of the women. Dr. Pollock, the statistician of the Hospital Commission, presents the causation in illuminating tables which show the unequal proportions affected in the sexes and the principal causes of the psychoses.

CAUSES OF INSANITY IN MALES AND FEMALES

CAUSE IN NEW YORK STATE, 1912–13	PER CENT	
	Males	Females
Alcohol	22.6	7.6
Syphilis	21.1	7.8
Senility	9.3	12.1
Arteriosclerosis	13.2	11.0
Acute illnesses	0.5	1.6
Injury to head	2.6	0.4

Pollock comments: "The psychoses due to harmful indulgence and exposure are far more prevalent in men than in women, while those arising from bodily weakness are, as a rule, more common to women."

PRINCIPAL CAUSES OF CERTAIN PSYCHOSES

PSYCHOSES	Principal etiological factor other than heredity	Per cent
Senile	Senility Arteriosclerosis	100.0 57.7
Dementia paralytica (paresis)	Syphilis Alcohol Inferior constitution Arteriosclerosis	100.0 8.9 6.9 4.6
Dementia paralytica (paresis) with other brain or nervous diseases	Arteriosclerosis Syphilis Alcohol Inferior constitution	63.3 18.9 8.7 7.4
Alcoholic	Alcohol Inferior constitution	100.0 13.1
Dementia præcox and allied to dementia præcox	Inferior constitution Sexual irregularities Alcohol	28.5 6.5 4.7
Manic-depressive and allied to manic-depressive	Inferior constitution Childbirth (women only) Alcohol	14.4 7.8 5.7

Native and Alien Insane. Dr. Spencer L. Dawes, special commissioner by appointment of Governor Dix of New York State, corroborated the previous claim that there are confined and supported in this country a number of alien insane out of all proportion to the native born. In 1912 the foreign-born insane constituted 43.4 per cent of the insane in civil hospitals in that State against 30.2 per cent of foreign born in the general population. This excess imposes an immense expense upon the taxpayers, for their net cost to the State in that year was $2,579,902, Dawes reports, omitting all reference to hundreds of aliens removed from the State hospitals in 1912. If allowed to complete their average hospital residence, the probable net cost of the 9241 aliens (out of 13,728 foreign born) under care on Sept. 30, 1912, will be $25,412,038. The danger to the population from absorbing a deteriorated and degenerate foreign stock is apparent. The present law (1915) provides that an immigrant may be returned to his native country if he becomes insane within two years, from causes existing at the time of immigration, prior to landing. Economists are calling attention to the necessity of making the time of probation at least five years and of conducting a searching examination into the history and antecedents of all immigrants.

Prognosis. About 60 per cent of the cases of manic-depressive insanity recover. Many relapse, if similar causes operate. Terminal dements, paranoiacs, senile dements, syphilitic dements, and paretics never recover. The average number of recoveries of all kinds of cases, excepting the hopeless, is about 29 per cent. Most recoverable cases emerge during the first year of their illness; few recover after two years have passed. Early confusion of ideas, indecency, persistence of delusions, and obesity are unfavorable symptoms. Recurrence occurs in about 21 per cent of ordinary asylum patients. The offspring of insane parents are defective; therefore no one who has ever been insane should propagate children.

Treatment. The treatment of insanity is a matter of great complexity. There can be no magical removal of manifestations by specific drugs. All improvement is slow. Dietetics forms an important part of the regimen, as do regular exercise; judicious control or direction; diversion by means of games, music, or the play; occupation, which is of great importance; isolation from worry, care, noise, company, or habitual environment; and the contact with the healthy, hopeful, reasoning minds of nurses and physicians. Drugs are indispensable in many conditions of malnutrition, insomnia, disordered circulation, etc. Restraint by means of mechanical contrivances is almost abolished in well-ordered asylums, except the restraint of confinement and of regulations. But some form of mechanical restraint is necessary and very helpful in certain cases, such as absolute refusal to take food or determined attempts at suicide. Most cases require and are benefited by sanitarium treatment or custodial care.

Medico-Legal Aspects of Insanity. The plea of insanity as an excuse for crime has been fashionable at intervals. There are cases of imperative impulse under which the lunatic commits an act which would be a crime in a sane man, but for which the lunatic is irresponsible. No case occurs in which but one insane act is committed, while the person was well balanced before that act and remains well balanced forever after it. In authentic cases a well-marked history of insanity before the act can be elicited, and insanity continues thereafter. "Temporary aberration" in an otherwise sane person does not occur. Amnesic and irresponsible intervals occur in psychic epilepsy (see EPILEPSY), during which crime may be committed; but the preceding and continuing epilepsy will be established. The knowledge of right and wrong is an improper basis upon which to judge the mental condition of a criminal. With a keen sense of right and wrong, a desire to do the right, and a dread of punishment, an insane person may obey and commit a crime under the all-powerful compulsion of an imperative impulse, in utter helplessness. But when insanity is established as the cause of a crime, the unfortunate perpetrator should be committed to a hospital and never, under any circumstances whatsoever, to a jail. Lunatics should be, in general, confined in hospitals or retreats. Their prospect of improvement or recovery is never injured by incarceration in a proper institution. Society deserves protection from their acts, fraught with danger to themselves or others. The physical and financial interests of their families deserve consideration. Their individual interests are advanced by confinement in the majority of cases. See next article.

Commitment of the Insane to Asylums or Hospitals. In many countries, and in most of the States in the Union, special safeguards are erected by laws to prevent the confinement of sane people in institutions for the insane, as well as to secure to the insane a full enjoyment of their rights. For instance, in the State of New York an alleged insane person may be committed to an institution legally licensed for the reception and care of the insane only after a complicated though not public process. In this State the word "asylum" exists no longer, but has been replaced by "hospital." There are no more "keepers," but trained nurses and instructed attendants have the immediate care of the mentally astray. A State Hospital Commission controls all matters relating to the insane. This commission is composed of a medical man of at least five years' experience in the actual care of the insane in an institution of some size and who has been in charge of institutions for the insane, a lawyer of at least five years' experience in his profession, and a layman, all three appointed by the Governor of the State. These commissioners issue or revoke licenses to physicians whereby they are permitted to conduct or forbidden to conduct institutions for the care and treatment of the insane. They also are charged with the duty of visiting all State and private institutions in which insane are treated and confined, supervising and in a sense directing their government. Any judge of a court of record may appoint as an examiner in lunacy a physician of whom he approves, who has been in the actual practice of his profession at least three years, and who is a permanent resident of the State. The commitment paper, as formulated by the New York State Commission, consists of five parts: (1) a petition, to be made by a member of the family of the alleged insane person, by a person living in the house with him, or by a county officer, setting forth the reasons of the petitioner for believing the person insane and asking the court to act in the matter; (2) a certificate made under oath by two examiners in lunacy, giving the results of their joint examination of the patient; (3) a waiver of personal service of the order of court upon the person in question, to be signed by the committing justice in his discretion, or a substitutional service; (4) an order for a hearing before the justice, if in his opinion this be necessary or desirable, or be requested; (5) an order of a judge of a court of record committing the alleged insane person to the chosen hospital or retreat, after officially declaring him to be insane. In the case of indigent lunatics, who are partially or totally a charge upon the State, a further statement is made by the justice concerning the patient's financial condition, as far as can be ascertained. This entire proceeding may be concluded, with the exception of the *hearing*, without publicity or violation of the privacy that should surround family matters; yet it prevents a conspiracy to incarcerate a sane man as insane.

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INSANITY. Technically, in law, a disease or disturbance of the mental faculties which may produce some effect on the legal character or quality of the insane person's acts. It may or may not render him non compos mentis, i.e., subject to legal restraint or control of his person and property. It may thus be distinguished from lunacy, which may be described as such mental unsoundness as to incapacitate the insane person for all legal transactions and justify the state through the proper agency in taking charge of his person and property.

The law takes cognizance of insane persons as such, chiefly for the following purposes: (1) to ascertain their responsibility for crime; (2) to ascertain their capacity to make contracts; (3) to ascertain their liability for their torts; (4) to ascertain their capacity to make wills.

1. **Responsibility for Crime.** The insanity of one charged with crime may preclude the existence of the criminal intent which is an essential element of the crime. When, therefore, the plea of insanity is set up on behalf of one charged with crime, the question raised is, Was the accused capable of forming a criminal intent at the time when he committed the act? The law on this subject was first fully considered, and a legal test of insanity in criminal cases adopted, in M'Naghton's case by the English House of Lords in 1843. M'Naghton, having killed another while under the influence of an insane delusion, was charged with murder, and the question of his responsibility under the law was put to the judges of the House of Lords. They answered in substance that mere insanity was not a defense; that to establish want of criminal responsibility it must appear that the party accused was laboring under such defect of reason as not to know the nature and quality of the act he was committing; that an insane delusion would not establish want of responsibility unless the delusion if true would justify the defendant in doing the act with which he is charged. Thus, one who killed another under an insane delusion that the other was threatening his life under circumstances of immediate danger to himself is not criminally responsible for the homicide; but an insane delusion that another was slandering the defendant would not excuse him for killing or even assaulting the supposed slanderer, assuming always that in other particulars the defendant knew the nature and quality of his act. M'Naghton's case still represents the law in England, and its rules have been adopted by the courts of most of the United States.

The effect of these decisions is to hold to full legal responsibility one who commits an offense under the influence of an insane, irresistible impulse if he knew at the time the nature and character of his act. And this is generally the law, although it is conceded that there can be no criminal act without a free agent, and there may be in a given case the strongest evidence of the existence of such an impulse. The courts of a few States, however, under the influence of the medical doctrine that such insanity does in effect rob the afflicted person of the power to act in accordance with his knowledge of the nature and quality of the contemplated act, recognize such a plea as a good ground of defense, but hedge about their ruling with the most stringent requirements as to proof of such mental defect. Idiocy or imbecility is also a defense to crime. The test adopted, viz., that one must have as much mental capacity as a child 14 years old in order to be convicted of crime, is not very satisfactory, but is probably the best possible. So-called moral insanity and emotional insanity have never been recognized by the courts as a legal defense to crime, though the former is not infrequently the real reason for the jury's acquittal of a person committing murder under such circumstances—a result popularly known as the application by the jury of "the unwritten law."

On the trial of a person for a crime, the prosecution is not in the first instance required to introduce evidence of sanity of the defendant. Upon the defendant's offering evidence to establish his insanity the burden of proving sanity is thrown upon the prosecution. Theoretically, since the effect of insanity is to show absence of criminal intent, the prosecution should be required to prove sanity beyond a reasonable doubt in order to establish criminal intent. In a few States this is the rule. In the majority, however, the defendant is required to prove his insanity by the preponderance of evidence, and in one or two to prove his insanity beyond a reasonable doubt. Insanity may also be a bar to the trial or punishment of one charged with a crime. The test of insanity in the one case is the defendant's ability to understand the nature of the charge and of the trial, and in the other the nature and purpose of the punishment.

2. **Capacity to Contract.** The contracts of a lunatic, i.e., one who has judicially been placed under control, are void, and no rights or liabilities are acquired under them either by the lunatic or the person dealing with him. The contracts of one who is insane, but who has not been judicially declared to be a lunatic, are in general voidable, i.e., they stand as valid until he or his legal representative set them aside. Formerly it was held that the law would not allow one to plead his own insanity in order to avoid his contracts, since he would by so doing stultify himself. This harsh and unjust rule no longer obtains. If the insanity is of a character such as to prevent an insane person from understanding and reasoning properly with reference to the contract and its terms, and the insanity is known to the person dealing with him, then the contract may be avoided at the option of the insane person or his legal representative. If, however, the person dealing with him does not know of the insanity, and he have nothing to put him on his guard, the weight of authority is that such a contract cannot be avoided unless the same party could be placed in statu quo. An insane person is absolutely liable for necessaries duly supplied to himself or his wife upon the theory of quasi contract (q.v.). See NECESSARIES.

3. **Liability for Torts.** Justice and public policy require that insane persons should be bound to pay from their property for damage caused by their torts to others, and it is generally the law that insane persons are liable for their torts. In the case of malicious torts, as libels and slanders, insanity may render the mind incapable of entertaining malice, in which case there is no liability, and for the same reason insanity of a defendant may be a ground for not awarding punitive or vindictive damages. See TORT; DAMAGES.

4. **Capacity to Make a Will.** Insanity does not necessarily render one incapable of making a will. It is declared by the best judges that so high a degree of mental ability is not needed to make a will as is requisite to the formation of a valid contract. The criterion of testamentary capacity in this respect, as stated by the New York Court of Appeals in the celebrated Parish will case (Delafield *v.* Parish, 25 New York, 9, 35), has been generally accepted and acted on in England and the United States. It is that the testator must be capable of understanding the nature of the business in which he is engaged, of summoning before his mind, without prompting, the property of which he wishes to dispose, and the persons who are the natural objects of his bounty, and of retaining them in his mind a sufficient length of time to arrive at a rational conclusion. The two salient elements of this requirement are a retentive memory and the capacity to form a rational conclusion. A person's mind may be greatly deranged or somewhat enfeebled and yet be sufficiently strong to meet this requirement. Insanity of a testator is also of importance in determining the question of undue influence which under certain circumstances may invalidate a will. See WILL.

An insane person is a competent witness to testify as to all matters about which he is not insane or mentally unbalanced. In dealing with questions of insanity courts concern themselves very little with the theories and speculations of psychologists and physicians, and no attempt is made to classify the various forms of insanity, except in the manner already indicated. The important question in every case is the mental competency, according to the well-settled rules of law, of the person upon whose acts judgment is to be passed regardless of the precise cause or nature of his disorder. The fact of insanity must be established by direct evidence and is usually, though not invariably, established by experts, who are allowed great latitude in giving testimony as to the mental capacity of the alleged insane person.

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INSANITY, IMITATIVE. See IMITATIVE INSANITY.

INSANITY, PUERPERAL. See PUERPERAL INSANITY.

INSATIATE COUNTESS, THE. A tragedy by John Marston (1603), sometimes attributed to Barkstead.

INSCRIPTIONS (Lat. *inscriptio*, from *inscribere*, to write upon, from *in*, in, upon + *scribere*, to write). The name applied to writings upon durable material, such as stone or bronze or terra cotta. Ordinarily such writings are engraved, but they may also be painted. The number and variety of the inscriptions of the past are very great, and the term is of course applied with equal correctness to the records on gravestones or other monuments of the present. The far greater use of inscriptions in ancient times, and the large variety of subjects upon which they furnish information, have made epigraphy, or the study of this class of monuments, an important branch of the science of antiquity. For many peoples the inscriptions are almost the only source of our knowledge of their history, language, and customs. This is the case with Babylonia, Assyria, ancient Persia, and to a very great extent with Egypt; the Lycian, Phrygian, and Etruscan languages are known only through the records on the monuments, and these are only a few examples of languages whose peoples are revealed to us by inscriptions. Even where an extensive literature has been preserved in other forms, as in the case of Greece and Rome, the monumental records throw new light on the classic texts and add numberless details, which enable us to fill out the picture of ancient life, of which the literature so often preserves only the outline. Inscriptions in the widest sense include the picture writings of the North American Indians, the hieroglyphics of Central America and Mexico, and all the other forms in which man has endeavored to preserve his records upon indestructible materials. In many of these cases, however, the content of the record is either unintelligible or unimportant, and the interest centres in the form. These systems are therefore more appropriately described under WRITING. In cases where the inscriptions are the chief or only source for the life and history of their makers, or are noteworthy for the kind of writing employed, they are naturally discussed in connection with the lands from which they come or the characters used. Consult, therefore, the articles ASSYRIA; BABYLONIA; CUNEIFORM INSCRIPTIONS; EGYPT; ETRURIA; HIEROGLYPHICS; HITTITES; MINÆANS; SABÆANS; WRITING.

The most ancient inscriptions are those found in Mesopotamia and in Egypt, and these countries have furnished by far the largest number of these records of Oriental history and civilization; but in their form and contents they extend beyond the domain of epigraphy and are more properly treated under the special titles just mentioned.

Under Semitic inscriptions should strictly be included any inscription composed in a Semitic language. For practical purposes, however, the term is usually limited to such inscriptions as are written in the systems of alphabetic writing developed by Semites, and these systems furnish a convenient basis of classification. Two great groups may thus be distinguished: the North Semitic, employing an alphabet of which the Phœnician is the type, and including Hebrew and Aramaic together with Nabatæan and Palmyrene; and the South Semitic, whose alphabet is represented by the modern Abyssinian character (Amharic, Tigrina). The *North Semitic* group is divided into two principal sections:

1. The *Phœnicio-Palestinian*, including Phœnician (to which the Carthaginian, or Punic, both old and new, belongs), Hebrew, Moabitic, and Samaritan. 2. The *Aramaic*, which begins about the second century B.C. and later can be separated into Nabatæan, or Sinaitic, Palmyrene, Syriac, and Mandæan. Not all of these groups are of equal importance, for in some cases the scanty epigraphic material adds but little to what is known from the literature, while in general it may be said that only the early documents are of special interest either in language, contents, or form.

Though the published Semitic inscriptions are numerous, the great mass are brief records from gravestones, or isolated names, or graffiti, such as cover the rocks of the Sinaitic Peninsula. The immense variety that characterizes Greek and Latin epigraphy is lacking here, partly perhaps because so few sites have been systematically explored. Two of the most important North Semitic inscriptions, the Moabite Stone and the Siloam Inscription, are treated in separate articles. (See MOABITE STONE; SILOAM.) The most important Phœnician inscription is that on the sarcophagus of Eshmunazar, King of Sidon, now in the Louvre, which is probably from the end of the fourth century B.C. Earlier but shorter are the inscriptions of Eshmunazar's father, Tabnith, and of King Jechaumelech of Byblos, which may be as early as the fifth century B.C. The earliest evidence for the existence of a North Semitic language is furnished by the Tell el-Amarna Letters, which themselves belong in the fifteenth century before our era; while especially interesting is the Hebrew inscription found in the tunnel leading to the pool of Siloam. This inscription refers to the completion of the tunnel and probably dates about 700 B.C., when Hezekiah had in mind to supply Jerusalem with water. The earliest writing of this group is probably on the fragments of metal cups from Cyprus, which seem to be even earlier than the Moabite stone and may perhaps belong in the tenth century B.C. At a later date, in the fourth century and later, come many inscriptions from various places in Cyprus. An important Carthaginian document is the long inscription in Marseilles, containing regulations regarding sacrifices, including the fees to be paid by the worshiper and the division of the victim with the priest. An important group is formed by the Aramaic inscriptions, now in Berlin, of Senjirli, in northern Syria, some of which belong to the first half of the eighth century B.C. and throw an interesting light on the relations of these petty kings to Tiglath-pileser III of Assyria, their suzerain. The Nabatæan inscriptions, which are numerous, show a rather cursive type. At Palmyra many inscriptions in the local alphabet have been found, for the most part mortuary and dating from the first three centuries of our era. Of especial interest is a long bilingual, in Greek and Palmyrene, of 137 A.D., containing the customs, duties, and tolls, which are recorded to obviate the frequent disputes between the caravans and the customhouse officials. Among the late inscriptions especial interest attaches to a bilingual, Syriac and Chinese, in western China, relating to the work of Nestorian missionaries in the region about 781 A.D. The North Semitic inscriptions are best discussed, and the important texts collected and illustrated in facsimile, in Lidzbarski, *Handbuch der nordsemitischen Epigraphik* (Weimar, 1898), which also contains a very complete bibliography; consult also Cooke, *Text-Book of North Semitic Inscriptions* (Oxford, 1903). The inscriptions are collected in the still incomplete *Corpus Inscriptionum Semiticarum* (Paris, 1881 et seq.), prepared under the direction of the French Académie des Inscriptions et Belles-Lettres.

The *South Semitic* group of inscriptions, though but little known until comparatively recent times, have furnished valuable information in regard to the early history of Arabia, and their study has developed into a most important branch of Semitic research. This group may be provisionally divided into four sections: the *Safaitic*, the *Liḥjanian*, the *South Arabian*, and the *Abyssinian*. 1. The Safaitic inscriptions, found in the neighborhood of Es-Safa, south of Damascus, are chiefly epitaphs and contain little more than the names and genealogies of the deceased whose memory they preserve. Apparently they do not antedate the first century of the Christian era. Consult Halévy, *Essai sur les inscriptions du Safa* (Paris, 1882), and Littmann, *Zur Entzifferung der Safâ-Inschriften* (Leipzig, 1901). 2. *Liḥjanian* is the name given to a class of inscriptions found in recent times at El-Oela, in northern Hejaz, because the King of Liḥjan (an Arabian tribal name) is mentioned in them as the ruler of the district in which they occur. They are not numerous, and the mutilated condition in which most of them have been found renders their interpretation extremely difficult. Their date is somewhat doubtful, but they seem to be contemporary with the rule of the Ptolemies in Egypt. Consult D. H. Müller, *Epigraphische Denkmäler aus Arabien* (Vienna, 1889), and Nöldeke, *Die semitischen Sprachen* (Leipzig, 1899). Far more important than the two classes just mentioned are (3) the *South Arabian* inscriptions, found principally in the southwestern corner of the Arabian peninsula. These inscriptions, which are very numerous, refer chiefly to the dedication of buildings or the presentation of various objects to the gods, and they throw much light upon the religion of the ancient Arabians. They contain, moreover, many valuable historical and geographical allusions and enable us to reconstruct at least an outline of the history of the country for a period which until recent years has been involved in complete obscurity. The South Arabian inscriptions exhibit several dialects, each possessing marked grammatical peculiarities. The oldest inscriptions are composed in the dialect of the *Minæans*, whose kings ruled over a large part of Arabia at least as early as the fourteenth century B.C., their influence extending as far north as the borders of Palestine. About the eighth century B.C. their dominion passed into the hands of the *Sabæans*. In these two dialects the great mass of the South Arabian inscriptions are composed. The dialects of Katabân and Hadramaut, in the extreme southern part of Arabia, are represented by a few inscriptions. Both these dialects seem to have been more closely related to Minæan than to Sabæan. Of the large number of South Arabian inscriptions collected by various explorers, notably by the Austrian scholar Eduard Glaser, a very considerable portion yet awaits publication. Consult: Glaser, *Skizze der Geschichte und Geographie Arabiens* (Berlin, 1889–90); Winckler, *Musri, Meluhha, Ma'în* (ib., 1898); Weber, *Studien zur südarabischen Altertumskunde* (ib., 1901); id., *Arabien vor dem Islam* (Leipzig, 1902). Hommel, *Südarabische Chrestomathie* (Munich, 1893), contains a very complete bibliography of the subject, down to the date of publication. See also MINÆANS; SABÆANS. 4. The *Abyssinian* inscriptions, found at the ancient capital Axum, are few in number and belong to a late period. The earliest date from about 350 A.D. and are written in the Sabæan modification of the South Semitic alphabet. In inscriptions of a later date (about 500 A.D.) the Ethiopic system of writing, as used in the manuscripts, is found fully developed. Consult: Bent, *Sacred City of the Ethiopians* (London, 1893); D. H. Müller, *Epigraphische Denkmäler aus Abessynien* (Vienna, 1894); Glaser, *Die Abessynier in Arabien und Afrika* (Munich, 1895). For Semitic inscriptions in general, consult the *Corpus Inscriptionum Semiticarum*. See also ETHIOPIA.

In recent years considerable attention has been paid to the study of the *Hittite* monuments, which are found throughout Asia Minor as far west as Smyrna, though they occur most abundantly around the Bay of Iskanderun, in Cappadocia, in Cilicia, and in northern Syria. In 1899 a long Hittite inscription was found at Babylon, whither it had been conveyed as a trophy. The Hittite inscriptions employ a species of hieroglyphic writing, the individual characters representing parts of the human body, animals, birds, and other objects. In the older inscriptions the hieroglyphs are cut in relief, while in those of later date they are incised. Many attempts have been made to decipher these inscriptions, but so far with slight success. Professor Jensen of Marburg has at least made a beginning, and his identifications of ideographs and sign groups for various countries seem to rest upon solid grounds. He believes that the language belongs to the Armenian branch of the Aryan family, but the known facts are too scanty to warrant a definite conclusion upon this subject at present. Consult: *Corpus Inscriptionum Hettiticarum* (Berlin, 1900–06); Messerschmidt, *Die Hettiter* (Leipzig, 1902); A. H. Sayce, in the *Proceedings of the Society of Biblical Archæology* (London, 1903, 1905, 1907); A. T. Olmstead and others, *Travel and Studies in the Nearer East*, vol. i, pt. 2 (Cornell Expedition, 1911); D. S. Hogarth, "Hittite Problems and the Excavations of Carchamish," in *Proceedings of the British Academy* (Oxford, 1912). See also HITTITES; AMARNA LETTERS.

The old Persian inscriptions are exclusively regal. The longest and most typical one is that at Behistun (q.v.), which recounts the life and deeds of Darius I. The shorter inscriptions of the same King, as well as of his successors, Xerxes I and Artaxerxes I, II, and III, are more occasional in subject. They are in the main dedicatory tablets, set up at Susa, Persepolis, Elvand, Naqs-i-Rustem, and Suez. Like the Behistun inscription, these minor texts express a deep and unfeigned religious spirit. In style the Old Persian inscriptions show in many phrases the influence of the earlier Assyro-Babylonian tablets, although the freer Aryan spirit is manifest throughout. The Old Persian inscriptions have been edited several times. The best editions are by Rawlinson, "The Persian Cuneiform Inscription at Behistun," in *Journal of the Royal Asiatic Society*, old series x–xi (London, 1846); Spiegel, *Altpersische Keilinschriften* (Leipzig, 1881); Tolman, *Persian Inscriptions* (New York, 1892); Weissbach and Bang, *Altpersische Keilinschriften* (Leipzig, 1893). Consult also the bibliography of CUNEIFORM INSCRIPTIONS.

Far more numerous than the remains of the Semitic peoples are the inscriptions in Greek and Latin. It was the custom of both peoples to record in this form all documents which it seemed desirable to bring or keep before the public eye. Hence almost any excavation on a large scale brings to light a multitude of inscribed stones. The number of these monuments is entirely unknown; in 1891 Larfeld estimated the Greek inscriptions alone at 50,000, and the intervening years have brought large increase. The Latin inscriptions are far more numerous, and any estimate must be merely conjectural.

Greek. Greek inscriptions are found upon various types of monuments; but of these the funerary monuments, or stelæ, are especially rich in inscriptional forms. But also of great frequency are the state documents which appear on separate stones or even upon the walls of buildings. There is evidence for the coloring of the letters. In the matter of form of the letters marked differences are to be observed as time progresses. The earliest inscriptions, if the primitive form of the letters does not mislead, are the rock-cut names of the island of Thera (Santorin), which may be dated in the seventh century. With these, though probably later, may be classed the rude names carved by the Greek mercenaries of King Psammeticus of Egypt on the colossi at Abu-Simbel. It is still a matter of dispute whether Psammeticus is the first (654–617 B.C.) or second (594–589 B.C.) of that name, but the analogy of other early inscriptions seems to favor the former date. The archaic inscriptions, written in local, or *epichoric*, alphabets, are tolerably numerous, but for the most part of interest and value chiefly for the history of the alphabet or the language, as they form one of the most important sources for the study of the Greek dialects. These early inscriptions are frequently written retrograde, i.e., from right to left, or *boustrophedon* (*βουστροφηδόν*), i.e., alternately from right to left and left to right. By the end of the fifth century the various local alphabets were generally superseded by the Ionic alphabet of Miletus, but the local dialects lived much longer. Progress of course varied with the locality. Crete, e.g., long retained the ancient forms, and the longest and most important of archaic inscriptions, the laws of the Cretan Gortyna, in alphabet and dialect appears so primitive that it is still placed by some scholars early in the sixth century B.C., though the weight of competent authority is in favor of a date in the last half of the fifth. The classification of Greek inscriptions is, in the first place, geographical. If the number of inscriptions from a locality is very great, or changes in the alphabet sharply marked, it is often found convenient to introduce chronological subdivisions. A good example is the arrangement of the collection of the Attic inscriptions, by which the first volume contains the inscriptions before 403 B.C., when in the archonship of Euclides the old Attic alphabet was officially replaced by the Ionian; the second volume includes the period from 403 to 31 B.C., the date of the battle of Actium, which was chosen for practical convenience rather than from any natural cleavage at this point, and the third embraces the inscriptions of the Roman Imperial period. Such elaborate subdivision was needed in this case because of the enormous mass of Attic inscriptions, which far exceed those from any other locality. Under the several localities, or periods, the inscriptions are grouped according to their contents. Two great groups may be distinguished, according as the inscriptions proceed from the governing body of the community or from private individuals or associations. The *public* inscriptions include decrees and ordinances of all kinds, treaties, lists of magistrates, and reports of official boards; they are naturally of the greatest value for the study of governmental institutions and ancient communal life. Thus, our knowledge of the details of the organization of the Athenian Empire, the assessment of the tribute, and the relations of the subject cities, rests in large part upon the records of the Hellenotamiæ and the decrees of the Athenian assembly. The *private* inscriptions are even more inclusive, as they touch ancient life at almost every point. Mortuary inscriptions naturally form the largest class, but we have also many honorary inscriptions and especially dedications to the gods. Here also belong the numerous records of manumissions, such as covered the wall of the portico of the Athenians at Delphi, in which the slave is by a legal fiction purchased by the god. An important group is composed of the records of private corporations, either business, religious, or social. Of great value for the history of art are the numerous signatures of ancient artists, usually on the pedestals which once bore their works. (Consult Loewy, *Inschriften griechischer Bildhauer*, Leipzig, 1885.) A curious example of a private inscription, which also illustrates the importance attached to this mode of publication, is furnished by Diogenes of Œnoanda in southeastern Caria, who recorded on the wall of a portico for the edification of his fellow townsmen a long summary of the teachings of Epicurus, with letters and other quotations from the writings of the master. (Consult *Bulletin de correspondance hellénique*, vol. xxi, Paris, 1897.) A detailed discussion of the characteristics of the several classes of Greek inscriptions does not lie within the scope of this article, but it will be well to add a brief notice of the material and the places used for these records. In general, stone, usually marble, is the material employed. Relatively very few of the Greek inscriptions are on bronze. In the case of graves, votive offerings, or honorary statues, the inscription is obviously an accessory, and the place is primarily determined by other conditions. For decrees, treaties, records of officials, royal letters, or any other documents for which publicity was desired, the market place, or acropolis, of a city, or the precincts or even walls of a temple, were the favorite places. The great sanctuaries, such as the Acropolis of Athens, Delos, Delphi, and Olympia, were crowded not only with statues and works of art, but also with inscribed slabs of stone, often containing some vote of a distant community. The expense of private inscriptions was of course borne usually by the persons concerned, and public enactments were in like manner engraved at the expense of the state; but there are very many cases where the decree of a state or corporation honoring an individual was published in stone at the expense of the recipient, who in this way showed his appreciation of the honor conferred.

The value of these records as a source of information did not escape the ancient historians. Herodotus, Thucydides, and Xenophon, as well as the orators, refer to them, but do not, as a rule, quote them directly, unless perhaps in citing the terms of treaties. But the systematic collection and use of inscriptions seem to begin at the end of the fourth century. The records of the public games and dramatic contests were utilized in compiling lists of victors or in determining the chronology of plays. Attic inscriptions were collected by Philochoros (320–261 B.C.), while Polemo of Ilion, at the beginning of the second century, diligently gathered dedications, artists' signatures, and numerous other records from the Greek sanctuaries; his work is partly preserved in the guidebook of Pausanias. The Greek Anthology owes many of its poems to the collections of epigrams compiled from the monuments by earlier scholars. During the Middle Ages interest in Greek, and still more in Greek inscriptions, was almost unknown, and it was not till the fifteenth century that the study of Greek epigraphy secured the attention of scholars, who naturally were at first attracted by the more abundant Latin remains. Cyriacus of Ancona (q.v.) in his numerous travels in the Levant copied many inscriptions, but his zeal frequently outran his knowledge, and in many cases it seems only too clear that his ancient documents owe their origin to the classical authors rather than to the stones. It was not till 1603, however, that an attempt at a complete collection of inscriptions appeared in the *Inscriptiones Antiquæ Totius Orbi Romani* of I. Gruter (2d ed., in 4 vols., 1707, by Grævius). In this and a number of similar works which followed, the inscriptions were grouped in classes, while the language and chronology were wholly neglected in the arrangement. Naturally the Latin inscriptions were in a vast majority. During the seventeenth and eighteenth centuries the attention of epigraphists was given rather to the acquisition of new material from the gradually opening Levant, which was visited by scholars sent out by the French Académie des Inscriptions et Belles-Lettres and the English Society of Dilettanti, as well as by numerous independent travelers, than to the compilation of complete collections. The vast increase in the material rendered such a collection a necessity, and in 1815 the Berlin Academy intrusted the preparation of such a work to August Boeckh. After 10 years of labor the first part of vol. i of the *Corpus Inscriptionum Græcarum* appeared, and the complete volume, which contained first the oldest inscriptions, important for their alphabet, and then those of Attica, Megaris, Peloponnesus, Bœotia, Phocis, Locris, and Thessaly, in 1828. Vol. ii did not appear till 1843, nor vol. iii till 1853, while vol. iv, though partly published in 1859, was not completed by the addition of the indexes till 1877. Though this work labors under what would now be considered serious defects, it laid the foundation which alone made possible the development of the severely critical methods of modern epigraphists. Even before the appearance of the second volume the increase in the material resulting from the independence of Greece and the active exploration of Hellenic lands showed that new collections would be needed, and before the completion of the work it was obvious that the projected supplement would be entirely inadequate to a proper publication of the new inscriptions. In 1871, therefore, the Berlin Academy entered upon the preparation of a new *corpus*, which is still in course of publication. (See *Bibliography.*) Along with this gigantic collection of all the monuments there has gone on the publication of many lesser collections—either inscriptions in a single museum, as the British Museum, or from single places, as Olympia and Pergamon, or noteworthy for their age or dialect—while all the archæological journals devote much space to the new material which explorers, especially in Asia Minor, or excavators are continually bringing to light. In conclusion, brief mention should be made of the Greek inscriptions of Cyprus, which are written in part in a peculiar syllabic alphabet, wholly unlike the Greek, but possibly with affinities to some of the undeciphered syllabaries of Asia Minor, and of the use of Greek characters for inscriptions in non-Greek languages, such as Lycian, Phrygian, Carian, Pamphylian, and the unknown tongue represented by two inscriptions from Præsos on Crete. Though the values of the letters are generally certain, the languages themselves are not yet read with any certainty.

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scriptions in the British Museum, vols. i, iii, iv, 1 (Oxford, 1874 et seq.); *Olympia*, vol. v, *Die Inschriften* (Berlin, 1890); *Die Inschriften von Pergamon* (2 vols., ib., 1890, 1895). Consult also Le Bas and Waddington, *Voyage archéologique en Grèce et en Asie Mineure pendant 1843–44* (Paris, 1847–76), and Cauer, *Delectus Inscriptionum Græcarum propter Dialectum Memorabilium* (2d ed., Leipzig, 1882). For dialectic inscriptions, consult Collitz, *Sammlung der griechischen Dialektinschriften* (Göttingen, 1884–1905). For the archaic alphabets, the standard collection is Roehl, *Inscriptiones Græcæ Antiquissimæ præter Atticas in Attica Repertas* (Berlin, 1882), and a volume of facsimiles only, *Imagines Inscriptionum Græcarum Antiquissimarum* (2d ed., ib., 1894). Dareste, Haussoullier, and Reinach, *Recueil des inscriptions juridiques grecques*, i, ii, 1 (Paris, 1890–98), is important for Greek legal inscriptions. Useful collections for the student are: Michel, *Recueil d'inscriptions grecques* (ib., 1900); Hicks and Hill, *Manual of Greek Historical Inscriptions* (2d ed., Oxford, 1901); and, above all, Dittenberger, *Sylloge Inscriptionum Græcarum* (2d ed., 3 vols., Leipzig, 1898–1901). The metrical inscriptions have been collected by Kaibel, *Epigrammata Græca ex Lapidibus Conlecta* (Berlin, 1878), and (for the period before 250 B.C.) by Hoffman, *Sylloge Epigrammatum Græcorum* (Halle, 1893). A collection of the Greek Christian inscriptions has been begun by the French Academy.

Latin. The earliest Latin inscriptions cannot rival the antiquity of the Greek. The gold fibula, or brooch, of Præneste is probably of the sixth century B.C., and some have claimed an even greater antiquity for the broken column of the Roman Forum, though the best authorities consider it scarcely older than the middle of the fifth century. Another early example, the so-called "Duenos inscription" on a curious triple-bodied vase from the Esquiline, is very probably of the fourth century, but is still a puzzle to scholars. With very few exceptions, however, the Latin inscriptions are not older than 300 B.C. In its earliest forms the alphabet shows strongly its connection with the Greek, which reached the Romans from the Chalcidians of Cumæ and, like other early attempts at writing, is marked by crude and variable forms for the letters. Later were developed the large square and handsome monumental characters (*scriptura quadrata* or *lapidaria*), which were carefully carved after preliminary tracing and then colored, usually with red. Painted inscriptions, not carved, naturally show freer forms, and these were later often imitated in stone, as were sometimes the common cursive hands, which are found in wax tablets in graffiti and often on domestic utensils of various kinds. The inscriptions are usually divided into two great classes: 1. *Tituli*, employed to designate some definite object, giving the needed information to distinguish it from similar objects; such are mortuary, dedicatory, and honorary inscriptions. 2. *Acta*, or documents, which are engraved for purposes of publication. The former are far more numerous and show naturally a more stereotyped form. Among the mortuary inscriptions are noteworthy the many metrical epitaphs, often crude in metre and cold in expression, but also not infrequently showing tenderness and deep family affection. In general the classes of inscriptions are the same as recur in Greece, but one or two Roman customs may be mentioned. The person who erected a temple or any other public building was usually allowed to engrave his name upon it, and these *tituli* are a much more important class of monuments than in Greece, where this was not a usual habit. Such inscriptions are valuable sources of information as to the date and circumstances under which these works were constructed. The numerous milestones not only mark the course of the ancient roads, but show the distances and names of the chief towns and the dates when the roads were built or repaired and by whom the work was directed. For the *acta*, bronze seems to have been the favorite material before the time of Augustus, but later the Greek use of marble was commonly adopted. They include treaties (rare), laws, decrees of the Senate and, in great numbers, of various town councils and corporations, the edicts and letters of Roman magistrates and especially of the emperors, and the numberless documents relating to the service of the gods. Among the Imperial edicts belong the military diplomas, or formal discharges which conferred on the retiring veterans special privileges. In connection with the service of the gods belong the calendars which were prepared during the early Empire. Here may also be mentioned the *fasti*, or lists of consuls and other important magistrates, of which there are many remains. Among these religious inscriptions an important place is taken by the records of the Arval Brothers (q.v.), and the account of the great secular games of 17 B.C., with its mention of Horace's *Carmen Sæculare*. A special place is occupied by the great *Monumentum Ancyranum*, the account by Augustus of his deeds (*index rerum a se gestarum*), engraved in Greek and Latin on the walls of the temple of Augustus and Rome at Ancyra in Asia Minor, after the original bronze tablets on the mausoleum of the Emperor in Rome. (Consult Mommsen, *Res Gestæ Divi Augusti*, 2d ed., Berlin, 1883, and Fairley, *Monumentum Ancyranum*, Philadelphia, 1898.) The Romans do not seem to have collected inscriptions as did the Greeks, though references to them are not infrequent in the histories, as Livy or Suetonius, and in other writers, from whom no complete collection has yet been made. At the very end of the ancient time and the beginning of the Middle Ages, when Rome became a place of pilgrimage, during the eighth and ninth centuries, many of the inscriptions were copied by visitors, and several of these compilations have been preserved wholly or in part, the most celebrated being the *Anonymus Einsiedelensis*. After the ninth century came a long period of neglect of the classical remains, and one of the first to revive these studies was the celebrated tribune of Rome, Cola di Rienzi, who about 1344 prepared a description of Rome in which he used the epigraphic material at his hand. Another collection was prepared in the early fifteenth century by the enthusiastic student of the past, Poggio Bracciolini, and from that time collectors of inscriptions are numerous and at times decidedly unscrupulous. Latin epigraphy in the sixteenth century suffered from forgers, at whose head stands Pirro Ligorio, of Naples, and their work deceived many until its character was disclosed by the exact scientific criticism of the nineteenth century. The earliest printed collection seems to have been that of the inscriptions of Ravenna (1489). Gruter's great collection of 1603 has already been mentioned. (See under *Greek.*) It was followed by collections by Reinesius, Fabretti, and others, till Muratori published his *Novus Thesaurus Veterum Inscriptionum* (4 vols., Milan, 1739–42), which his lack of knowledge made of but little real service. The foundations for the modern study of Latin epigraphy were laid by the careful and minute investigations of Bartolommeo Borghesi (died 1859), who devoted his life to a study of the *fasti* of Roman magistrates. A *corpus* of Latin inscriptions had been planned by the Berlin Academy, and also suggested by the French Academy; but the project was first realized when after a long period of preparation there appeared in 1863 the first volume, edited by Theodor Mommsen and Wilhelm Henzen. Since then the work has steadily continued, though it is still incomplete and from the nature of the case is always likely to be in need of supplements.

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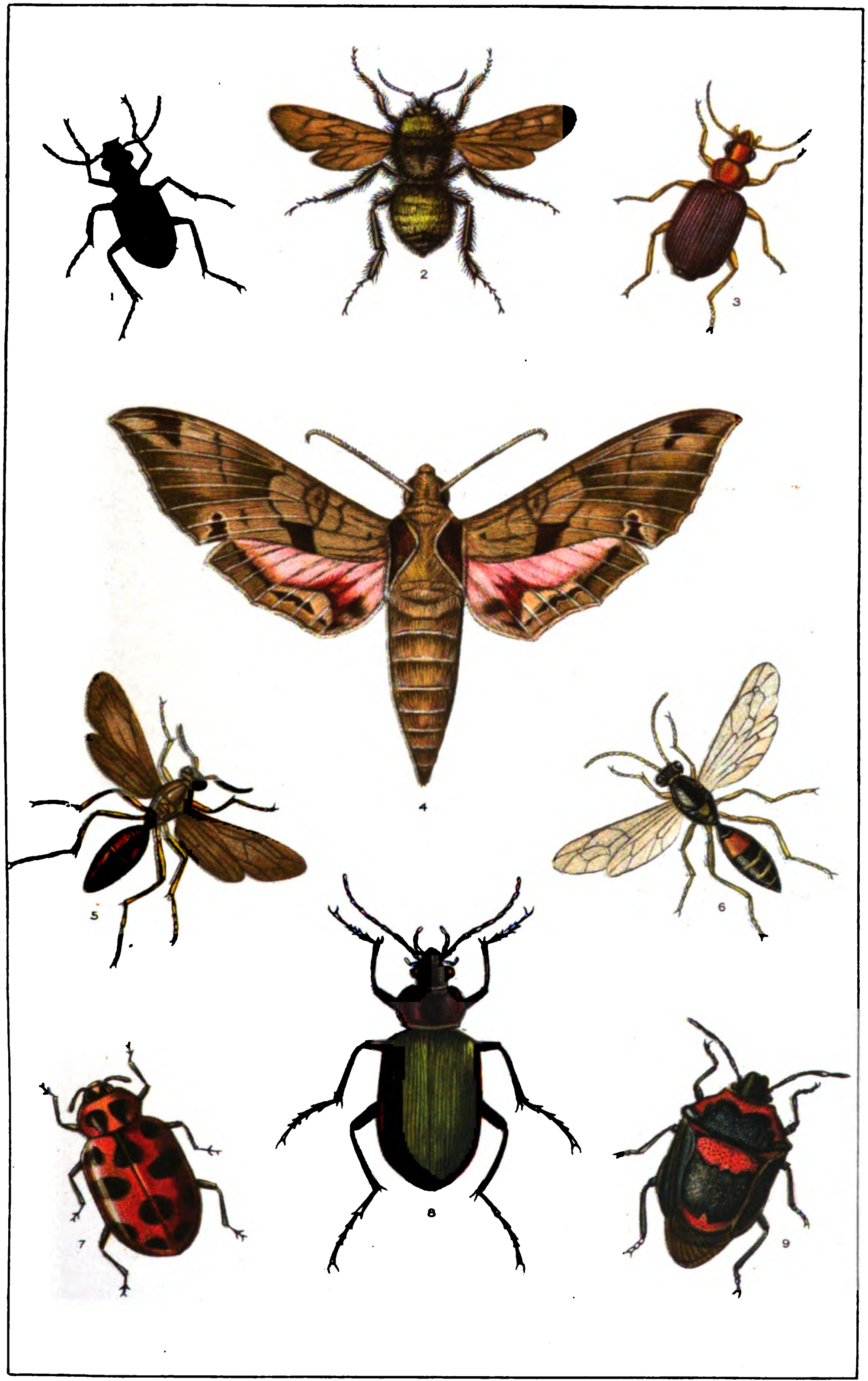
IN'SECT (Lat. *insectum*, insect, from *insecare*, to cut in, from *in*, in + *secare*, to cut). In its strict sense, a member of a group of six-legged arthropods known as the class Insecta or Hexapoda. Vulgarly the term is applied to almost any small crawling creature; and even among naturalists until comparatively recent years it was applied to the spiders and their relatives (Arachnida) and to the centipedes and thousand legs (Myriapoda). Insects constitute by far the largest group of living creatures and in fact form much the larger part of the land animals of the world. In number of species they are more numerous than all of the other groups of land animals together, while in number of individuals they are countless. The most conservative estimate places the number of species of insects in existence at 5,000,000, while the estimate of Riley, the famous entomologist, was 10,000,000. They are extremely variable in their habits.

Food. The great majority feed upon vegetation of one kind or another, and practically every part of every living plant is liable to insect attack. They feed not only upon living vegetation, but also upon dead plant tissue in every stage of decay, and even upon soil mold wherever it occurs, and are largely instrumental in the rapid disappearance of dead vegetation. Thousands of species also prey upon animals of different groups, from the warm-blooded vertebrates down to creatures of their own class and the other lower forms of animal life. They feed not only upon living animals, as parasites and predatory enemies, but also upon dead animal matter of all kinds, including excrementitious substances, as well as upon fabrics and other things composed of animal material. Although predominating so enormously on land, insects lose their preponderance in water, yet very many species are aquatic during the whole or some portion of their lives.

Economic Importance of Insects. It has been pointed out by the United States Department of Agriculture that the tax imposed by insects upon the agricultural and timber industries of the United States is greater than "the entire expenditures of the national government, including the pension roll and the maintenance of the army and navy." The damage done by insects is nearly 10 times that done by fire. Since before the plagues of Egypt man has had to contend with insect enemies, and, notwithstanding our increasing knowledge of the habits of insects and the inventions of new methods

INSECTS



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JULIUS BIEN & CO. LITH. N.Y.

1 SIX-SPOTTED TIGER BEETLE - CICINDELA SEX GUTTATA
2 AMERICAN BUMBLEBEE - BOMBUS PENNSYLVANICUS
3 POTATO-BUG ENEMY - LEBIA GRANDIS
4 ACHEMON SPHINX-MOTH - PHOLUS ACHEMON
5 CLOAKED WASP - POLISTES PALLIPES
6 ICHNEUMON FLY - ICHNEUMON JUCUNDUS
7 SPOTTED LADYBIRD - MEGILLA FUSCILABRIS
8 GREEN CATERPILLAR-HUNTER - CALOSOMA SCRUTATOR
9 BORDERED PLANT-BUG - STIRETRUS ANCHORAGO

Nos. 1 AND 8 SOMEWHAT ENLARGED; No. 3 ENLARGED NEARLY TWICE; Nos 7 AND 9 GREATLY ENLARGED

of controlling the injurious species, the economic loss from insects seems to be increasing.

The most destructive species are usually those which have been introduced from some other country, because it usually happens that parasites which kept these pests from multiplying to an excessive extent in their native land were not imported with them.

The *Hessian fly* (q.v.) is the most important enemy with which the wheat, rye, and barley growers must contend. It destroys from 10 to 50 per cent of the sowings. This damage amounts to about $75,000,000 annually in the United States alone. *Aphids* (see APHID) cause a further loss to the same crops of more than $15,000,000.

The Mexican *chinch bug* (q.v.) has cost the corn growers of America at least $400,000,000 in the last 50 years. It now levies an annual tax of more than $30,000,000. The Western corn rootworm, the ear worm, and other enemies doubtless make the total loss at least three times this amount.

Hay and forage crops are subject to the attacks of many insect enemies. The best known of these is the *army worm* (q.v.), which often costs the United States several million dollars in a single season. It is estimated that 10 per cent (worth about $65,000,000) of American hay crops is destroyed by insects every year.

In 1904 the Central American *cotton boll weevil* (see COTTON INSECTS) cost Texas, alone, $25,000,000. It has spread throughout much of the cotton district; but fortunately it is yielding to control measures, so that the annual damage done by it in America is only about $20,000,000. The cotton worm and minor pests bring the total annual tax levied by insects on the cotton industry up to about $85,000,000. The same sort of tax on tobacco amounts to about $10,000,000.

Insects decrease the profits of the truck farmer about 20 per cent; but, since there are no figures to show the total value of truck crops, it is difficult to say what the total damage is. It is probably about $60,000,000.

The fruit growers suffer greatly from insects. If a continual warfare were not waged against it, the European *codling moth* (q.v.), or *apple worm*, would entirely prevent the growing of marketable apples. The loss and cost of treatment come to about $20,000,000 annually in the United States. Another introduced pest, the *San José scale* (q.v.), has destroyed millions of trees. It costs, each year, from 10 to 25 cents per tree to keep it under control. There are, in all, about 300 species of insects which are more or less injurious to American fruit trees. With much difficulty and expense only about 80 per cent of fruit in the United States is saved from insects. It may be remarked in this connection that *Phylloxera* (q.v.), an American insect which is mildly injurious to grapes in the United States, found its way to France, where it destroyed the vineyards of whole districts.

In addition to eating the leaves of forest trees and sapping their vitality in other ways, insects bore into the standing timber and reduce its market value, sometimes even killing large numbers of trees. They also damage lumber after it has been made ready for the market. One hundred million dollars a year would not pay for these depredations. The introduced *gypsy moth* (q.v.) and *brown-tailed moth,* although still confined to New England, have become such a pest that fully $1,000,000 are spent in their control. This does not include the damage they do. The latter has recently shown itself capable not only of great damage to trees, but also of direct harm to human beings, actually causing serious illness in some cases. This brown-tailed moth (*Euproctis chrysorrhea* Linnæus, family Liparidæ) was accidentally brought from Europe to Massachusetts about 1890. It became established there and has since spread throughout much of New England. There is still a possibility of its reaching new districts, chiefly by being carried on nursery stock; but it is now so well known that there is no likelihood of its becoming a serious pest elsewhere.

The adult moth measures about 1 inch or 1½ inches across the white wings. The end of the abdomen is conspicuously brown, hence the common name. The adults appear in July, congregating in great numbers about lights. Each female lays a mass of 300 or 400 eggs, which she covers with brown hairs from the tip of her abdomen. These eggs are laid on the terminal leaves of almost any sort of deciduous tree. Caterpillars hatch in about three weeks and feed until cold weather, when they fasten a number of leaves together and to a twig with strong silk. Several hundred caterpillars, usually those which hatched from a single egg mass, gather in each hibernaculum thus formed and pass the winter. They emerge as the buds burst in the spring, and after feeding for a month or six weeks they spin thin cocoons of white silk, inside of which they pupate and complete the life cycle by appearing as adults in July.

The larvæ are very dark brown marked with patches of orange. They have numerous tubercles, which bear so many short brown hairs as to give the creature a velvety appearance. These hairs are barbed, and when they touch the human skin they enter it, causing a rash much like that produced by poison ivy. The larvæ are frequently so abundant that the air is filled with their hairs, and whole communities become affected by the rash. In addition to this they are one of the most destructive of the insect enemies of deciduous trees, frequently defoliating large areas.

Besides the damage done by insects to forest trees and other wild plant growths, neither harvested crops nor manufactured articles are free from insect attack. Various kinds of beetles and caterpillars feed on dried vegetable products as well as eat woolens. This damage probably amounts to about $200,000,000 annually.

Furthermore the dairymen and cattle raisers have important enemies among insects and nearly related creatures. The ox warble (see BOT), an immature fly which causes "grubby" cattle hides, causes an annual loss in the United States of about $25,000,000. Other species of bots attack horses and sheep. It is impossible to say how greatly the milk supply is decreased by the numerous flies which at first thought seem to be merely annoying to cows. It is estimated that the annual injury inflicted upon American live stock by insects and ticks amounts to the enormous total of $420,000,000.

All the estimates given above are very conservative. They are based upon most careful estimates and the best obtainable statistics. The total damage done every year in the United States by a few species of insects amounts to more than $1,250,000,000.

It is pleasant to turn now to the other side of the question. Although insects lessen our fruit crop by 20 per cent, we owe nearly all our fruits to insects, because fruit trees depend largely upon insects for pollination. All our most beautiful flowers seem to have been developed by the cross-fertilization (see POLLINATION) carried on by insects. Insects destroy 10 per cent of the hay crop, but we should have no clover were it not for them. It is safe to say that the earth would be uninhabitable in a few years if all the insects were suddenly exterminated.

Furthermore predacious and parasitic insects are the most efficient agents known for the control of injurious species. Aphids are greedily devoured by the immature as well as by the mature ladybird (q.v.) beetles. The army worm is rarely very injurious in the same locality in two successive seasons, because its increase one year is favorable to the increase of its parasites, which hold it in check the next year. The citrus industry of California seemed doomed because of a scale insect, but a predacious beetle was imported from Australia and saved the day. Had the parasites of the gypsy and brown-tailed moths been imported with them and become established, it is not likely that these moths would have been notably injurious. After all other methods of controlling them had failed, the United States government began the systematic importation of parasitic insects. There is great hope of ultimate success.

Certain insects furnish articles of commercial importance. The most notable are honey, silk, and lac. Honey is the surplus food laid up by the *honeybee* (see BEE) for winter consumption, and beeswax is the material which forms the comb. Silk is a substance produced by the caterpillar of the *silk moth* (see SILKWORM) for protection during its quiescent pupal stage, when the creature changes from a caterpillar to a winged moth. *Lac* (q.v.) is an exudation from a scale insect. Formerly the red body fluid of the *cochineal* (q.v.) scale insect was much used as a dye, but aniline dyes have now largely taken its place.

In order that injurious insects may be more successfully combated and beneficial ones more generally propagated, all civilized governments employ trained entomologists. The United States Department of Agriculture has a Bureau of Entomology which investigates and reports on entomological matters of national importance. These reports may be obtained from the superintendent of documents, either free or at a nominal charge. Each State also has an entomologist, whose office is usually in the State capital. Some of the State bulletins are very instructive, and queries concerning injurious insects should usually be addressed to the State entomologist. Quarantine against foreign insects which are or are likely to become injurious is carried on by both the Federal and State governments. Consult: O'Kane, *Injurious Insects and how to Recognize and Control them* (New York, 1912); E. D. Sanderson, *Insect Pests of Farm, Garden, and Orchard* (ib., 1912); Slingerland and Crosby, *Manual of Fruit Insects* (ib., 1914); *Journal of Economic Entomology* (Concord, N. H.); and the various State and national bulletins.

Insects and Disease. As annoying man himself, insects play an important part, since there are very few regions of the habitable globe where man is not troubled by them. Bedbugs, fleas, lice, mosquitoes, the screw-worm fly (see BEDBUG, FLEA, LOUSE, MOSQUITO, SCREW WORM), and many other species are troublesome. It is, however, as carriers of disease that insects are perhaps of the greatest importance. The filaria diseases of the East (elephantiasis, chyluria, and lymph scrotum) are transferred by certain mosquitoes. The Texas fever of cattle in the United States, the red-water diseases of Africa, and other cattle fevers are transmitted by certain ticks which are not insects but arachnids. The tsetse fly of Africa carries the microörganisms of disease; the purulent conjunctivitis of the Egyptians and Fiji Islanders is communicated by the house fly; the eye disease known as "pinkeye" in the southern United States is transported by minute flies of the genus *Hippelates*. Asiatic cholera and typhoid fever are carried by the house fly; and the bubonic plague is spread by fleas from rats. All forms of malaria are carried about by mosquitoes of the genus *Anopheles* (see MOSQUITO), and yellow fever by those of the genus *Stegomyia*. (See MOSQUITO.) It has also recently been claimed that dengue fever is in Syria spread by a mosquito of the genus *Culex;* that anthrax bacilli in malignant pustules in human beings are caused by the bite of flies of the genera *Tabanus* and *Stomoxys;* and that the famous "surrah" disease of cattle in Oriental regions is also carried by gadflies.

Poisonous Insects. Certain insects may be considered under this head which poison human beings in any one of several different ways: 1. They may have a sting which is a modified ovipositor, and which is connected with a specific poison gland, as with the bees, wasps, stinging ants, and certain other Hymenoptera. 2. There may be a modified salivary gland which has a poisonous secretion and is connected with a piercing beak, as with certain bugs of the order Heteroptera, and as with many dipterous insects like mosquitoes and other biting flies. 3. The hairs covering the body surface may be modified into sharp bristles, which may be simple or barbed, and which, when coming in contact with the skin of human beings, produce an urticating or nettling effect. Poisonous insects of this group are confined to the caterpillars or larvæ of certain moths, especially of the family Limacodidæ, and, to a much less marked extent, a few of the caterpillars of Bombycidæ, such as *Orgyia leucostigma*, *Euproctis chrysorrhea*, as well as to a few of the Saturnidæ, like the larva of the Io moth. 4. Certain beetles when crushed produce a blistering effect upon the skin. These are confined to the family Meloidæ, or blister beetles. See BLISTER BEETLE.

The poison of bees is formed by the mixture of the secretions of two glands, one of which is acid and the other alkaline. With the burrowing wasps the alkaline gland is absent or atrophied, and the poison consists only of the acid. The effect of the sting of these wasps is either to stupefy the prey or to kill it. In either case the insects stung remain in excellent condition as food for the larvæ of the wasps for a considerable length of time. (See WASP.) The severity of the sting of the aculeate Hymenoptera and the amount of poison injected into the wound differ with different species. The sting of our large mud wasp (q.v.) is especially severe, and as a rule the stings of wasps have a more poisonous effect upon human beings than the stings of bees. There are cases on record where many bee stings on the same individual have produced death. Several instances have been well authenticated by medical men of the death of a human being from a single sting of a wasp, the sting acting as a very powerful irritant poison on the nerve centres of the patient. As a rule, such cases are confined to exceptionally nervous individuals, to those inheriting gouty tendencies, who are remarkably susceptible to the action of certain medicines. Persons handling bees and wasps become immune to their poison; the stings have little effect upon them. This immunity, however, disappears in the absence of continuous reinoculation. This fact is well known to beekeepers, and entomologists who collect wasps and other stinging Hymenoptera in large numbers have called attention to the same fact. The remedy for the stings of both bees and wasps is the immediate application of an alkali.

Many of the poisonous flies are treated of under Mosquito; Gadfly; Black Fly.

The true bugs which give a poisonous bite with a piercing beak, and which may attack man, belong almost entirely to the family Reduviidæ (see Cone-Nose), to which the terms "pirate bugs" and "kissing bugs" are applied. The Eastern species are *Opsiocœtes* (or *Reduvius*) *personatus*, *Melanolestes picipes*, and *Melanolestes abdominalis;* and the principal Southern and Western forms are *Rasahus biguttatus* and *Conorhinus sanguisugus*. (See Cone-Nose.) The bite of these bugs is specifically poisonous, but the great inflammation which so often occurs is doubtless due to the entrance into the circulation of germs of putrefaction, since the bugs are attracted to dead animal matter. The Eastern species (*Melanolestes picipes*) is a shining black bug rather more than half an inch in length. The principal Western species (*Rasahus biguttatus*) is reddish in color with blue-black fore wings, each marked with a round reddish spot. This latter species is, according to Davidson, the cause of nearly all of the supposed cases of "spider bites" in the Southwest.

Ecology. As a class, insects are represented in practically all parts of the world. While flourishing more abundantly in the tropics, they are found in countless numbers in the temperate regions and are also very numerous in boreal regions. They abound inside the Arctic circle, and in the short Arctic summer many species of nearly all orders may be collected. As a rule, as with other classes of animals, the forms occurring in tropical regions are larger in size and more brilliant in color. Many groups are confined to the tropics; others have a wide geographic distribution. The value of the class Insecta in the study of the geographic distribution of life is very great with certain groups, while others have comparatively slight faunistic value. Civilization exerts a direct and destructive influence upon the insect faunas of large regions. Insects being largely dependent, directly or indirectly, upon vegetation, the destruction of the wild flora and sylva and the introduction of cultivated crops almost immediately change completely the characteristics of a given insect fauna. The rapid development of methods of transportation, and especially intercommunication between remote regions, by means of the constantly increasing number and speed of vessels, has resulted in the accidental introduction and acclimatization of many hundreds of species of insects into regions remote from their original homes, many of which succeed in establishing themselves. The facility of acclimatization varies greatly with different groups, and this facility is dependent upon the degree of simplicity of the life of the insect and upon the degree of simplicity of its natural environment. So great has become the danger of the introduction of injurious species from one country to another during late years that many nations seek to protect themselves by special quarantine measures.

From what has preceded, it is evident that insects, in spite of their small size and their consequent slight strength, have been remarkably successful in the so-called struggle for existence. They have a long geological history, and the insects of Tertiary rocks are in some instances almost generically related to living forms. Rapidity of growth and power of multiplication have been prime factors in this persistence, while the relations which exist between circulation and respiration have been almost equally significant. In many instances the growth from the egg to the individual occupies only a few days, while in some species a single female will lay several thousands of eggs. The functions of circulation and respiration are so related that nutrition can be carried on very rapidly and very efficiently. By the phenomenon of metamorphosis, growth and development are isolated from each other, allowing growth to go on unchecked and uncomplicated by development.

The social life of insects is very remarkable; organized societies are formed with many species, especially the Hymenoptera (bees, wasps, and ants) and the Isoptera (white ants, or Termitidæ). In these societies great numbers of individuals live together and are greatly modified in structure in accordance with the different functions which they perform in the community. See Ant; Bee; Wasp; Termite; and *Social Insects*, below.

Reproduction. Nearly all insects undergo in the course of their lives remarkable changes in form. A few forms are ovoviviparous, i.e., bring forth living young, but the great majority lay eggs. (See Egg.) With some forms there is a development without metamorphosis, and in these the young insect just hatched from the egg is of the same form as the adult insect. With others there is what is termed an incomplete metamorphosis, i.e., where, although the young greatly resemble the adult, there is still a striking change of form during life. With others still there is what has been termed a complete metamorphosis (q.v.), in which the young just hatched is strikingly different from its subsequent stages. With the bees, butterflies, flies, beetles, and other insects, the form which hatches from the egg, and which is known as the "larva," is a "grub" or a "caterpillar." This, after reaching full growth, passes into another form, which is known as the pupa, and in which in the majority of cases the insect is quiescent, while from this stage there eventually emerges the perfect insect. Larvæ grow by molting; the skin is more or less hard and is composed of chitin; a new skin is formed beneath the old skin, which eventually bursts and permits the larva to emerge. The number of molts differs with the larvæ of different groups and ranges from two or three to as many as 12 or more. The phenomenon known as hypermetamorphosis sometimes occurs. With certain of the blister beetles, e.g., the first larvæ which are born possess legs, by the aid of which they can cling to a bee and be carried to its nest, where they will live on the food stored by the bee; after a molt they lose their legs and become almost organless, floating about in the honey. Later still, another form of larva is found. See METAMORPHOSIS, IN ANIMALS; LARVA; PUPA.

Social Insects. A great many insects lead solitary lives. Others, either as larvæ or as adults, are gregarious, and in gregarious feeding and gregarious life we have the beginning of social communities. Many lepidopterous larvæ, or caterpillars, feed together in great masses, like the army worm (q.v.) of the United States, and more especially the larvæ of certain silk-spinning moths, like the European processionary moth (*Cnethocampa processionea*), and less markedly the American tent caterpillar and fall webworm (qq.v.). These tents or webs for community feeding are carried to a higher degree of perfection in the European tineine moths of the genus *Hyponomeuta*, and still more perfectly in the community nests of a tropical butterfly (*Eucheira socialis*). A number of moths make communal cocoons, but nearly all of these are tropical. The beginning of a true communal life is seen with the ambrosia beetles (q.v.) of the family Scolytidæ. These are beetles which make galleries under the bark of trees, apparently cultivating a fungus which they use as food, preparing a bed for its cultivation; they also carefully remove excrement from the fungus gardens and practically bury their dead. The most perfect socialism, however, occurs among the bees, wasps, and ants of the order Hymenoptera, and among the termites, or so-called "white ants," of the order Isoptera. Not all bees are social. A large group is composed of solitary bees. Among the social bees a more or less primitive social life is found with the bumblebees. Here there is a communal existence. Nests are made, cells are constructed for the young, the young are fed by the adults, and there is a separation into three castes, viz., females, males, and drones. There is also the beginning of a separation of the drones into two castes—the larger ones in general attending to the mending of the covering of the nests and to the ripening of the honey, while the smaller ones for the most part do the inside housework, such as the wax repairing and the nursing of the young. The community life of the hive or honey bee is much more complicated than that of the bumblebee, but the workers seem to be more uniform in their duties. The stingless tropical bees of the genera *Trigona* and *Melipona* form very large communities, some of them even exceeding in size those of the honeybee, but the social life is practically the same. See BEE.

The wasps are also both social and solitary. The social species belong for the most part to the genera *Vespa* and *Polistes*. Their communities are much like those of the social bees. They are, however, not so perfect and not so persistent as those of the true honeybee or the ants, but resemble more nearly those of the bumblebee. The communities of the bumblebees and the wasps are annual. Those of the honeybees and the ants, as well as of the termites, last for a number of years. Among the wasps is a form known as worker, just as with the social bees; and the workers here, as in the other cases, are undeveloped females. Here also, as with the social bees, these undeveloped females or workers may lay eggs which invariably produce males or drones. Most of the social wasps make paper cells and nests, using for this purpose a wood pulp composed of fragments of wood moistened with saliva and macerated in the mouth. The economy of the social wasps is not perfectly understood, doubtless owing to the difficulty of studying them, due to the irritability of the insects and to their poisonous stinging. The size of the communities varies at the season when they are largest, from a few individuals to many hundreds, as many as 1200 cells being found in a single nest. On the approach of winter the males and workers perish, and the fertile females crawl into such protected situations as crevices of walls and in the bark of trees and there pass the winter in the dormant state. At the opening of spring each surviving female founds a new colony. At first she performs the duties of both queen and worker. A small nest is made, eggs are laid in it, and when the larvæ hatch they are fed and cared for by the queen until they are mature. This first generation is composed entirely of workers. They relieve the queen of the duties which belonged to her, and from this time forth her only duty is to lay eggs. The workers are engaged in the enlargement of the nest, in the construction of new cells, and in the care of the young.

With the ants we come to a more complicated social life. Here not only do great numbers of separate individuals live together and adopt different functions, according to the positions which they occupy in the colony, but these individuals are also greatly modified in structure and in their physiological processes, in such ways as to fit them especially for the parts they have to play. With the different families of ants the character of the colony differs very considerably. For a general account of the community life of the higher families and the general phenomena of ant life, see ANT; also DRIVER ANT; FORAGING ANT; HONEY-MAKING ANT.

The family Poneridæ, as pointed out by Wheeler, constitutes a primitive and generalized group of ants, wherein the colonies consist of a comparatively small number of individuals like the incipient colonies of the higher families. These small colonies appear to be annual growths formed by swarming, as in bees, and not by single fertilized female ants, unaccompanied by workers, as in the higher families, and as described under ANT. Two and more colonies of the same species can be fused to form another colony without much difficulty, which is not easily accomplished with many species of the more specialized ants. Their architecture is of a primitive character, consisting of a few irregular and unfinished galleries. The queen and worker differ but little in size and structure. Ergatoid females, or forms intermediate between the queens and the workers, are of normal and comparatively frequent occurrence in some species. The habits of the queen and worker are very similar; the female is not an individual to whom especial attention is paid by the workers. The workers show no tendency to differentiate into major and minor castes. They are carnivorous and live by hunting, in contrast with the various harvesting, fungus-growing, honey-collecting, and aphid-guarding members of the higher groups. They do not feed one another by regurgitation; nor are the larvæ fed by regurgitation, but are given pieces of insects, from which they suck the juices. It is fair to suppose that from such generalized beginnings the highly specialized and wonderful colonies of the higher groups of ants have sprung, and that the slave-making habits, the care of honey-producing insects, the differentiation of a soldier caste, the fungus-growing habit, and others have been developed by gradual evolution.

The phenomenon of polymorphism (q.v.) becomes very marked with ants, although it reaches a still higher development among the termites. The causes of the modifications seen in the different castes are still in dispute. Dewitz states that the caste is already determined in the insect before leaving the egg; Weismann associates the caste with some hypothetical rudiments existing at the very earliest stage of the embryonic process; Herbert Spencer and others believe that the character of the insect is determined by the nutrition of the larva, just as is the case with the honeybee. The chief forms of polymorphism in ants are the ordinary winged male, the ergatoid male, the winged female, the ergatoid fertile female (a form intermediate between female and worker), the soldier, the worker major, and one or more kinds of worker minor. In addition to these there are apparently cases of females with postmetamorphic growth in the Dorylides, but these have not yet been the subject of investigation. The fact that the social insects in which the phenomena of caste or polymorphism occur, though belonging to very different groups, all feed their young, is suggestive and lends weight to the theory that the differentiation is the result of character of the larval food. Emery accounts for this differentiation by assuming that it has been gradually acquired by numerous species, and that we now see it in various stages of development; also, according to Sharp, "that the variation in nutrition does not affect all the parts of the body equally, but may be such as to carry on the development of certain portions of the organization while that of other parts is arrested."

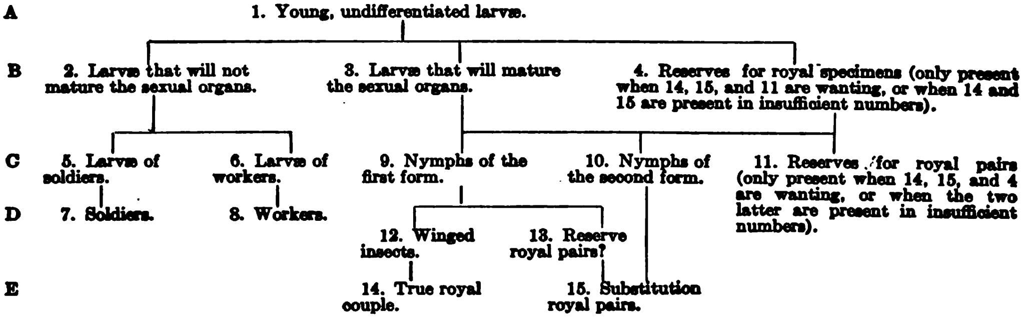
The so-called intelligence of bees, and especially of ants, has been a subject of wonder and comment on the part of many writers for hundreds of years. The observations of Lubbock, however, indicate that bees have not the high degree of intelligence with which many writers have credited them, and that in this respect they do not compare with the higher ants, which are ranked as the highest in point of intelligence among social insects. Riley, in his work entitled *Social Insects from the Psychical and Evolutional Points of View*, expressed himself as of the opinion that no one can doubt the possession by the social insects of intelligence, of conscious reasoning and reflective powers. He makes the statement, "We can never properly appreciate nor properly bring ourselves into sympathy with these lower creatures until we recognize that they are actuated by the same kind of intelligence as ours." Bethe (1898), however, in discussing the question as to whether or not we may ascribe psychical qualities to ants and bees, points out the danger of the observer injecting his own personality into the subject investigated. He shows, e.g., that, while we *see*, all we know about bees and ants is that they are influenced by the light, and that it would be most unscientific to say that they do anything as highly psychical as seeing, until it is proved. Some of the peculiar and apparently highly intelligent things which ants do, such as recognizing the enormous number of members of the same colony, and such as finding their way to their own nests and to food supplies and communicating intelligence of the location of food supplies from one to the other, have been carefully tested by Bethe, who concludes that he can find nothing in the phenomena exhibited by bees and ants to prove the existence of any psychical qualities. Lubbock thought that he had proved that ants communicated with one another, but Bethe used one of Lubbock's own experiments to show that it proved nothing. He concludes that they learn nothing, but act mechanically in whatever they do, "their complicated reflexes being set off by simple physiological stimuli." See facts under this head in article INSTINCT. For the best and most recent summary of facts and theories relating to the social life of the true ants, consult W. M. Wheeler, *Ants, their Structure, Development, and Behavior* (New York, 1910).

In the termites, or "white ants," we reach a very specialized form of the social or community life of insects. They reach their highest development in tropical regions; the females or queens grow to be of enormous size, the abdomen swollen with eggs sometimes becoming as big as a potato, or 20,000 or 30,000 times the bulk of a worker. The eggs may be laid at the rate of 60 a minute, or 80,000 a day. The species are all social, and communities consist of both wingless and winged individuals. The winged individuals are with most species excessively numerous, and as a rule they are divided into two castes, viz., the ordinary workers and the soldiers. The so-called soldiers also exist with the true ants, but they have not in these creatures become such a structurally well-differentiated caste as with the termites. In the latter the jaws have become enormously developed, and in some cases the soldier is five times the size of the worker. In some species some of the workers have branched off into another caste, the "nasuti," in which the head has become elongated into a long noselike process, at the tip of which is a hole through which is exuded a fluid which is used in making and mending the walls of the habitation. Although the social life of a termite colony is superficially much like that of an ant colony, the development of the social habit and the differentiation of forms have taken place along entirely different lines: the termites have an incomplete metamorphosis, the ants have a complete metamorphosis; the young of the termite is more or less capable of self-support soon after birth, whereas the larvæ of the bees and ants are entirely helpless during development and are fed by the adults. The fundamental difference between the two groups is that with the termites the workers or neuters, including the soldiers, are not undeveloped females, as with the workers and soldiers of the ants and the workers of the bees, but they consist of both sexes and are in reality the arrested or modified larvæ in which the sexual organs are imperfectly developed or are completely atrophied.

With the hive bee multiplication of colonies takes place by division, but the colonizing swarm carries with it a queen, and thus the foundation of a new colony is easy. With the higher termites multiplication of colonies also takes place by division; but this is carried out by the workers and soldiers, which travel away and capture one of the royal pairs that wander about after they have swarmed and thrown off their wings. Many colonies of termites will be found in which there is no queen. Among the different species of termites there is a marked gradation from a simple to a more complex economy. The continuance of a termite community is entirely dependent upon the king and queen, which are the adult individuals of both sexes which have swarmed and lost their wings. There is usually but a single pair in a nest, and they are frequently inclosed in a cell which they cannot leave. In consequence of the disorganization of the community if anything happens to the king or queen, termites keep certain individuals in reserve in such a state of advancement that they can rapidly be developed into kings and queens should occasion require it. When such individuals, however, are developed to meet the emergency, they are generally immature in the anterior parts of the body. The termite queen differs in one respect from any other known insect, i.e., in actual growth after reaching the adult stage, this growth being confined to the abdominal region of the body and being due to the necessity for an extraordinary number of eggs.

The complicated character of a termite colony is seen from the following table (from Sharp), which indicates the numerous forms which exist in certain communities:

FORMS OF TERMES LUCIFUGUS. (After Grassi)


A
1. Young, undifferentiated larvæ.
B
2. Larvæ that will not mature the sexual organs.
3. Larvæ that will mature the sexual organs.
4. Reserves for royal specimens (only present when 14, 15, and 11 are wanting, or when 14 and 15 are present in insufficient numbers).
C
5. Larvæ of soldiers.
6. Larvæ of workers.
9. Nymphs of the first form.
10. Nymphs of the second form.
11. Reserves for royal pairs (only present when 14, 15, and 4 are wanting, or when the two latter are present in insufficient numbers).
D
7. Soldiers.
8. Workers.
12. Winged insects.
13. Reserve royal pairs?
E
14. True royal couple.
15. Substitution royal pairs.

A very remarkable feature of the life of social insects is the frequent occurrence, in the colonies of almost all species, of "guests," or inquilines. Insects of several orders live in ant colonies, and symbiosis (q.v.) presents itself here under various aspects, among which, according to Wasmann, real hospitality (myrmetoxenie and termitoxenie) and relations of friendship (symphylie) take first rank, and, as far as we can tell, are unequaled elsewhere in the animal kingdom. Wasmann has studied more than 100 different species of insects living in the nests of ants and more than 100 different species in the nests of termites, but states that these form but a fraction of those hidden in the nests of tropical ants and jealously guarded by their "jailers." New and interesting discoveries are constantly coming to light in the tropics. Certain of the beetles found in these nests possess certain peculiar tufts of hair and are licked by the hosts on account of the pleasant secretion which comes from them. The peculiarly shaped antennæ of the guests indicate that they summon the ant at feeding time by tapping it with these organs. Certain rove beetles occurring in termites' nests are fed directly by their hosts. Many of the guests are curiously modified so as to present a striking resemblance to their hosts. With those living with blind ants the form is not modified, but the structure and the hair growths have become similar to those of ants. Among these guest insects (which when occurring in ants' nests are known as "myrmecophilous" and in termites' nests as "termitophilous") there are representatives of no less than 31 different families of Coleoptera, seven families of Hymenoptera, several families of Lepidoptera, Diptera, Orthoptera, Neuroptera, Pseudoneuroptera, Hemiptera, Thysanura, and there are also living as guests in these nests certain curiously modified myriapods, scorpions, spiders, mites, and isopod crustaceans. See INQUILINE; TERMITE.

Structure of Insects. The insects are most closely related to the myriapods and to the spiders and their allies (Arachnida). The body consists of not more than 21 segments, which are usually of unequal size and shape, arranged in three usually well-defined regions—head, thorax, and abdomen. The head is small and flattened or rounded, and is composed of not less than six segments, bearing eyes and at least four pairs of appendages, viz., one pair of antennæ and three pairs of mouth parts. The mandibles are one-jointed, without appendages. There are two pairs of maxillæ—the first pair separate, usually three-lobed, and with a palpus which is never more than six-jointed. The second pair unite to form the underlip and bear a pair of palpi never more than four-jointed. The epipharynx forms the roof of the mouth and bears taste organs. The hypopharynx is usually well developed and lies on the underside of the mouth just above the labium and receives the end of the salivary duct. There are a pair of compound eyes and usually from two to three simple eyes (ocelli). The thorax consists of three segments. There are three pairs of legs, each foot ending in a pair of claws; two pairs of wings, a pair to each of the two hinder thoracic segments. The wings are occasionally reduced or wanting in forms which, however, had winged ancestors. The abdomen consists at the most of from 10 to 12 segments, and there are no functional abdominal legs except in the Thysanura and in the larvæ of Lepidoptera. The genital openings are usually single, but are paired in some orders.

The digestive canal is highly differentiated in the winged orders. In larvæ it is a nearly straight tube extending from one end of the body to the other. In adult insects, however, it is usually much longer than the body and therefore is more or less folded. It is situated below the dorsal vessel and above the ventral chain of nerve ganglia. There are three main divisions, viz., the anterior, middle, and posterior. The anterior and posterior divisions are morphologically considered as invaginations of the extremities of the skin. The œsophagus is usually narrow, dilating behind to form the crop. Sometimes it dilates immediately behind the mouth, and this dilatation is known as "pharynx." It is followed by the "gizzard," or proventriculus. The true stomach, or chylific ventricle, is always present and is very variable in shape and size. Sometimes it is coiled like an intestine and sometimes bears pouches varying in number from two to very many. The intestine varies greatly in length, being smaller anteriorly and frequently widening to form a rectum. There are sometimes a cæcum and odoriferous glands. The alimentary canal has two coats of muscles, a longitudinal and a transverse coat. Salivary glands are present in many insects, discharge into the mouth, and vary greatly in their development. The silk spun by many larvæ comes from long silk glands similar in form and situation to the simple tubes of the salivary glands. Malpighian tubules are present in most insects in the hinder end of the body, opening into the alimentary canal usually at the junction of the stomach and intestine. They vary greatly in length and number.

The nervous system consists of a well-developed brain, and no more than 13 pairs of ganglia, which may be more or less confused in the specialized orders. The cephalic ganglia are placed above the œsophagus, while the other ganglia are ventral. There is an accessory sympathetic system which is complex and difficult of dissection. Respiration is carried on by means of a system of air vessels called tracheæ, which ramify through all parts of the body. These tracheæ connect with the outer air through a series of spiracles which are orifices at the side of the body, there being usually one pair for each segment. The tracheæ are elastic and consist of an outer cellular coat and an inner chitinous layer, the latter strengthened by a spiral fibre. With some insects, as with certain bees and locusts, the tracheæ expand in places to air sacs, and these sacs, as well as the finest capillary branches of the tracheæ, lack the spiral fibre.

Circulation is carried on through the dorsal vessel or heart, which is situated in the upper part of the body (just beneath the dorsal skin), extending from the head or thorax to the posterior extremity. It is an elongate tube consisting of a number of united chambers and is usually closed behind but open in front, having also several orifices at the side. There is a muscular layer with internal and external membranous layers. The blood is forced forward into the body cavity, receiving oxygen from the terminal branches of the tracheæ. The muscular system is extensive, nearly 4000 muscles occurring in certain caterpillars. See Gill.

Classification. According to the generally accepted classification, there are 19 orders of insects, as follows:

Thysanura, springtails and bristletails.
Ephemerida, May flies.
Odonata, dragon flies.
Plecoptera, stone flies.
Isoptera, white ants.
Corrodentia, psocids and book lice.
Mallophaga, bird lice.
Euplexoptera, earwigs.
Orthoptera, grasshoppers, crickets, etc.
Physopoda, thrips.
Hemiptera, true bugs, plant lice, scale insects.
Neuroptera, aphis lions, ant lions, etc.
Mecoptera, scorpion flies, etc.
Trichoptera, caddis flies.
Lepidoptera, butterflies and moths.
Diptera, true flies.
Siphonaptera, fleas.
Coleoptera, beetles.
Hymenoptera, bees, wasps, ants, sawflies, etc.

Representatives of these groups are illustrated by typical forms on the accompanying colored plate, which are described elsewhere, under their respective names. For a simpler arrangement of orders, see Classification of Animals. See also Colored Plates of Beetles, Butterflies, Dragon Flies, and Moths.

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INSEC'TA (Lat. nom. pl., insects). A class of six-legged arthropods, equivalent to the Hexapoda. See Insect.

INSEC'TICIDE (from Lat. *insectum*, insect + *-cida*, murderous, from *cædere*, to kill). A substance used by man to kill insects. Besides those materials properly included by this definition, however, there are many other agents of great importance as insect exterminators, of which the following may be classed as natural controls: changes of temperature at critical times in the life histories of insects; rain, flood; drought; forest and prairie fires; bacteria, fungi, mites, spiders, predacious and parasitic insects, and other invertebrates; fish, toads, reptiles, birds, anteaters, and other vertebrates. Though each of these exercises an important function in checking insect depredation, their offices are beyond the scope of the present article, which deals with artificial or man-applied controls.

For convenience of discussion the classification of insecticides may be made according to the two ways by which insects obtain food. Plant-feeding insects either chew plant tissue by means of movable jaws or else suck the juices through punctures in the epidermis made by their tubelike beaks. The chewing species may be subdivided into those that feed beneath the surface and those that feed in exposed positions. To the concealed feeders belong the leaf miners, which live beneath the epidermis of leaves, etc., and the borers in living and dead plants, timber, and grain. The only way these may be controlled is by poisonous gases (bean weevil), by drowning (peach borers, sometimes), burning infested parts (raspberry cane borer), or by digging them out (apple borer), the feasible method depending upon the habit of the species. To the exposed feeders belong caterpillars, grasshoppers, beetles, etc., which are usually controlled by stomach poisons, such as arsenical compounds, especially Paris green used at the rate of a pound in from 100 to 300 gallons of water, or Bordeaux mixture. (See FUNGICIDE.) Another popular poison is arsenate of lead, which adheres to the foliage better than Paris green and may be applied in larger quantities with less danger of injury. Of the newer insecticides, zinc arsenite and lead chromate are considered valuable. Hellebore is most frequently used upon small plants, especially for the currant worm. Some soft-bodied chewing insects may be controlled in the same way as sucking insects.

Sucking insects, among which are some of the most destructive pests of crops, cannot be controlled by stomach poisons, because they obtain their food from beneath the epidermis of the plant. Because of their small size, insidious habits, enormous prolificacy, and capability of withstanding treatment, they are among the most dreaded crop pests. Some (e.g., the squash bug) have never been effectually and economically controlled by any method yet devised. In general the most feasible controls are such as either obstruct the respiratory passages of the insects (tobacco, insect powder, oils, etc.) or have a caustic action through penetrating their spiracles, or breathing pores, dissolving the fats and paralyzing the nerve centres (lime-sulphur mixture, miscible oils, oil emulsions, whale-oil soap, etc.). Substances used for this purpose are known as contact insecticides. Since kerosene can rarely be applied with safety to growing plants, it is emulsified by mixing and churning violently 2 gallons of kerosene with a solution of 8 ounces of hard soap in 1 gallon of hot water, and diluted when needed for use with from 5 to 10 times as much water. Experiments have been made with pumps that mix kerosene and water in definite proportions as they are drawn from two respective tanks by the one piston stroke. Miscible oils and lime-sulphur mixture have come upon the market in recent years and are being used quite extensively. Whale-oil soap is applied as a solution of 1 pound in 1 to 10 gallons of water. Certain insects, notably the San José scale, a serious pest of woody plants, and the chinch bug, an equally troublesome pest of cereals, have been experimented upon in a unique way; fungus parasites were spread among them, in the first case by means of infected water sprayed upon them; in the latter by infected insects. The results have not been particularly satisfactory in either case. Not so in the case of the cottony cushion scale, a pest on citrus trees in California. A ladybird beetle, imported from Australia, in a few years extirpated the pest. This is perhaps the most notable instance of man's utilizing a natural control and making it an insecticide in the narrow sense. See LADYBIRD. Much has also been done with insect parasites, notably in the case of the gypsy and brown-tail moths and sugar-cane fulgorid.

Certain species of insects (clothes moths and granary insects) may be best destroyed by suffocation in the fumes of carbon disulphide evaporated in shallow dishes placed at the top of the air-tight receptacle containing the material to be fumigated. An ounce to 50 or 75 cubic feet is the usual proportion, the box being kept closed for 24 hours or more. Since the fumes of carbon disulphide are very explosive, lights must be kept away. Hydrocyanic-acid gas is also largely used to suffocate insects, especially certain greenhouse, nursery stock, and citrus pests, particularly scale insects and the so-called white flies, or aleyrodids. The gas is generated from potassium or sodium cyanide (98–99 per cent pure) in a mixture of sulphuric acid and water, the proportions being 1 ounce cyanide of potassium, 2¼ ounces water, 1½ ounces sulphuric acid for each 100 cubic feet for nursery stock operated upon; 125 cubic feet for trees, granaries, flour mills, and rooms; and 250 cubic feet for greenhouses. The usual exposures are from half an hour to an hour for plants and trees, according to whether they are growing or dormant, and 12 to 24 hours for rooms, etc. Since both the gas and the salt from which it is made are virulent poisons, no person who is not both careful and competent should employ them.

The insects that attack domestic animals and man, though individually serious pests, form a numerically insignificant group when compared to the great group of plant-feeding species. Hogs and sheep may be freed from lice by greasy mixtures and tobacco or carbolic washes; infested horses and cattle should be thoroughly curried once a week until the animals are free, the brush being dipped frequently in kerosene emulsion diluted with five or six parts of water. Similar remedies apply to the related parasites of the human subject, vaseline or lard being substituted for the kerosene emulsion. For the body louse and the crab louse hard boiling of infested clothes for half an hour or longer is essential, since the eggs are very resistant. Poultry may be kept free from lice by a liberal supply of fine dust, and their houses by fumigation with carbon disulphide or hydrocyanic-acid gas and the frequent application of kerosene and whitewash. Carbolic soap is a standard insecticide against fleas in pet animals. With animals of all kinds, however, cleanliness is a great safeguard, since the insects which arrive first are destroyed before they have a chance to breed.

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IN'SECTIV'ORA (Neo-Lat. nom. pl., from Lat. *insectum*, insect + *vorare*, to devour). An order of placental mammals, containing about 250 species, arranged in two suborders: (1) true Insectivora; (2) Dermoptera. The former includes the hedgehogs, tenrecs, moles, and mole-like animals, elephant shrews, true shrews, and the like, and the latter the "flying lemur" (*Galeopithecus*). None of the Insectivora are of large size; most of them are small timid creatures, generally nocturnal in their habits, and useful in the economy of nature chiefly in preventing the undue increase of worm and insect pests. Although many of them are not exclusively insectivorous, all of them have the summits of the molar teeth beset with small conical tubercles, well adapted for breaking up the hard coverings of insect prey. Their dentition is characterized by a distinct tendency towards suppression of the milk dentition, but otherwise is variable. The legs are short, and the feet of most of them are plantigrade. The cerebrum is small and smooth and does not cover the cerebellum. The order is regarded as one of the inferior and among the most ancient of the mammalian groups; and, with the exception of a single genus (*Solenodon*, of Cuba), they are now confined to the Northern Hemisphere and to South Africa and Madagascar, i.e., to Artogæa. An excellent review of the order is Dobson, *A Monograph of the Insectivora* (London, 1886–90). Also consult W. D. Matthew, in *Memoirs of American Museum of Natural History*, vol. ix (New York, 1909).

IN'SECTIV'OROUS PLANTS. Plants that catch and digest insects as part of their food. See CARNIVOROUS PLANTS.

IN'SECT POWDER, PYRETHRUM, BUHACH, DALMATIAN or PERSIAN INSECT POWDER. A brownish-yellow powder obtained by grinding the dried flower-heads of two species of *Chrysanthemum* (*Pyrethrum*), a genus of plants of the natural order Compositæ. The species employed are *Chrysanthemum coccineum*, popularly known as *Pyrethrum roseum*, and often grown as an ornamental summer-bedding plant, and *Chrysanthemum cinerariæfolium*, also called *Pyrethrum cinerariæfolium*. From the flowers of the former, a Persian species, is made Dalmatian or Persian insect powder—better known in Europe than in America; from those of the latter, a Caucasian species, extensively cultivated in California, is manufactured the insect powder buhach or pyrethrum, common in the United States. When fresh, the powder made from each species seems to be equally effective; but since the volatile oil upon which their effectiveness depends is lost with age and also by exposure to air and heat, the California product is considered with more favor in America than the imported powder. *Chrysanthemum cinerariæfolium* is preferred in California, because its flowers may be gathered at approximately one time, whereas *Chrysanthemum coccineum* has an extended period of bloom. The volatile oil acts upon insects by asphyxiation; upon man and other animals it has no serious effect; workmen in the pyrethrum mills suffer no more inconvenience than millers do from the dust in flour mills. The plants are fed to horses and other stock after the flowers have been gathered. In California, where some large farms are devoted wholly to this plant, the industry commenced in 1870, and three years later the small product was sold at $16 a pound. In 1885 the price had fallen to $0.45 a pound and has never since risen to unreasonable figures. The seed is sown about half an inch deep in light soil during autumn or spring, and the young plants transplanted when a few inches tall to the field, 2 feet by 4 feet apart, given irrigation each month during the dry season, cultivated by horse, and kept free of weeds by hand. A partial crop may be obtained the first year after planting, but the crop of the third year is usually the largest. Generally the plants continue to bear profitably for six years. The flowers are combed from their stems by hand during May and June, sun-dried, and ground between burr stones similar to those of old-fashioned flour mills, and after bolting packed in air-tight tin cans. Insect powder is usually employed in household use as dust. When flies, mosquitoes, and other insects are numerous and troublesome, it is often heated in closed rooms and the stupefied creatures swept up and destroyed before they recover. It is similarly used in greenhouses. Frequently also it is applied as a solution in water (1 ounce to 2 or 3 gallons) or in alcohol (1 ounce to 4 ounces by weight). The former is applied as mixed; the latter, after daily shaking for a week or more, is filtered and the clear liquid applied with an atomizer. This decoction, if applied to plants, should be diluted somewhat. Pyrethrum is also sometimes mixed with kerosene emulsion or other insecticides. See INSECTICIDE.

INSECTS, FOSSIL. Of all animals the insects, with their aërial habits of life, would seem at first thought to be the least liable to entombment and preservation in a fossil state. They are, however, found in great abundance in several localities where the nature of the deposition was particularly favorable to their fossilization. These deposits are nearly all of fresh-water (lacustrine or marsh) or of estuarine origin, though some few are purely marine. As a rule, the embedding materials are finely grained shales or limestone concretions in shales, or fossil gums and amber; the amber has furnished by far the most perfect fossil insects known. The shale beds of the Oligocene Tertiary at Florissant, Colo., are also noted for the abundance and perfection of their insect contents. Other noted repositories of fossil insects are the Carboniferous coal-measure beds of Commentry, France, described by Brongniart; the Liassic beds of Schambelen, Switzerland, of Dobbertin, Germany, and of Gloucestershire, England; and the Jurassic lithographic limestone of Bavaria. The Tertiary localities, from which great numbers of insect remains have been derived, are the Baltic provinces of Germany and Russia, where they occur in amber; the shales of Aix, France, Florissant and the White River District of Colorado, and Oening, Radoboj, and Parshberg. The wings seem to be preserved as fossils far more often than other parts of the insect body, and in many formations these are the only parts found.

The known fossil insects do not present any great points of difference from those now living. Those found in the Mesozoic and Tertiary rocks can be readily placed in modern families; but all Paleozoic insects show a certain general resemblance, with here and there points of relationship to the orders of modern insects. These orders did not become fully differentiated until Triassic time, although ancestral forms are easily distinguishable among the earlier members of the class. The Paleozoic insects have on this account been grouped under the name of Paleodictyoptera, a synthetic group, and have been distributed, according to their resemblances to modern forms, among several orders—the Orthopteroidea, Neuropteroidea, Hemipteroidea, etc., which are directly ancestral to the Post-Paleozoic and modern orders of Orthoptera, Neuroptera, Hemiptera, etc. The Paleozoic insects are of more primitive type, as illustrated chiefly in the wing structure, than are the Mesozoic insects. As a rule, their front wings are membranous—i.e., they had not yet evolved hardened front wings, such as the elytra and tegmina, that serve as protective coverings for the more delicate hind wings of modern insects. Some of the early insects were of gigantic size, compared with their living descendants—*Meganeura*, an ancestral dragon fly found in the Carboniferous of Commentry, France, had a body 16.5 inches long, and its wings spread over 28.5 inches. Another point of interest is that the Paleozoic insect fauna was made up almost entirely of cockroaches. These must have swarmed in the woods and swamps of the Carboniferous and Triassic periods, for their remains are found in abundance in the shales and sandstones associated with the coal deposits of those ages.

The earliest insect remains are of a very fragmentary nature. A fossil from the Ordovician rocks of Sweden has been supposed to be a wing of an ancestor (*Protocimeæ*) of the bedbugs, but this is doubtful. Cockroaches probably appeared in the Silurian, and they were the predominating types in the Devonian and Carboniferous. The Carboniferous fauna consists principally of Orthoptera and Neuroptera, and of forms intermediate between these two orders, and also of extinct types intermediate between the Orthoptera and the Hemiptera, and it is interesting because of its large number of generalized or synthetic types. In the Triassic the beetles appear suddenly with their characteristic hardened front wings fully developed. This difference in the character of the front and hind wings is fully marked for the first time in all Triassic insects, and it has become more strongly marked since that period. In the Liassic epoch of the Jurassic period insects were abundant, as might be expected from the general extension of terrestrial conditions during that period. Beetles abound, and as they represent many families still living, they have been used to determine the conditions of life and climate during that period. Leaf and fungus eating beetles and dung beetles are known. The earliest ants; the first well-marked bugs, allies of the squash bug; the first flies, bees, and perhaps also the earliest moths, are found in this epoch. The Cretaceous insect fauna is small, but that of the succeeding Tertiary, beginning with the Eocene, is almost as well differentiated as that of the present day, for many of the genera are still members of the living insect fauna. In all about 3000 species of fossil insects are known, and these are distributed among the geological eras as follows: about 10 per cent are Paleozoic, 15 per cent Mesozoic, and 75 per cent have been described from the Tertiary formations.

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INSECTS, PROPAGATION OF DISEASE BY. Careful observation and patient investigation have resulted in establishing the fact that the transmission of disease, in many instances hitherto unexplained, has been due to the agency of insects. The most momentous medical discovery during the year 1899 was that of the cause of malaria in human beings. There are several scientists to whom credit is due in the matter; but the lion's share of it belongs to Patrick Manson, of Dublin, and Major Ross, a surgeon in the British army, stationed at Calcutta. During several years of laborious work they forged the links that completed the discovery. As long ago as 1807 Crawford, an American physician, suggested the possibility of the transmission of malaria to man by the mosquito. Again, in 1848, Nott, of New Orleans, referred to the part played by insects in propagating malarial fever. In 1883 A. F. A. King (q.v.), of Washington, D. C., reiterated the theory at some length. Laveran (q.v.), who in 1880 discovered the *plasmodium malariæ*, or *hæmosporidium*, the parasite of the disease, declared in 1891 his adherence to the mosquito theory, as did also Flügge in the same year. In 1892 Pfeiffer showed that certain protozoa, called *coccidia*, which are found as parasites in the rabbit, are capable of two cycles of development, one being exogenous. He mentioned that Koch (q.v.) had suggested that a similar condition might hold good for the parasite of malaria, and that exogenous malarial spores might be conveyed to man by the agency of blood-sucking insects. In 1894 Manson, of Dublin, appeared as a vigorous supporter of the mosquito theory as best calculated to explain the various conditions of the problem. He drew a parallel between the malarial parasite and the *filaria bancrofti*, which he had investigated very thoroughly. He suggested that the female mosquito fills herself with infected blood, deposits her eggs, and dies beside them. The water in which she lies becomes contaminated with the spores developing in her body and is then drunk by men, or the spores are inhaled with dust from dried puddles, or the larvæ after being hatched feed on the dead body of the mother and thus become carriers of infection, or the ground may become infected by the bodies of mosquitoes that die and fall upon it. Ross's work in his studies of malarial organisms in birds' blood is really monumental. He discovered that after a special variety of gray mosquito had fed on the blood of birds containing a certain mature organism called *proteosoma*, the stomach wall of the insect always contained certain pigmented *coccidia* two days later. After other changes had occurred on the eighth or ninth day, the coccidia ruptured and set free innumerable threadlike bodies which are distributed by the blood current of the mosquito through her tissues. Eventually these bodies are found in certain glands in the thorax of the insect, whose ducts open at such a point as to furnish secretion that lubricates the lancets of the mosquito. When she punctures the skin of her victim, this secretion, containing the threadlike bodies, is injected into the bottom of the wound. Manson and his pupil, Daniels, proved that these threadlike bodies, or germinal spores, develop into mature proteosomata in a bird bitten by the infected mosquito, thus completing the cycle. While Manson was conducting his experiments, Grassi, the distinguished Milanese, was completing his studies on the mosquitoes of Italy.

In 1898 he determined that *Anopheles claviger* was the variety that carried malarial infection. A man who had never been subjected to malarial infection was exposed to the bites of the mosquito *Anopheles claviger* and in a short time began to suffer from malarial fever. Quinine cured him of the attack. The Italian scientists Bignami, Bastianelli, and Grassi, working in conjunction, arrived at the conclusion that the malarial hemisporidia (which consist of small reproductive cells produced within a cyst) run through a cycle in man which is characterized by a long amœboid stage and an absence of the encapsulated phase, reproducing themselves a great number of times during the completion of this cycle, and also giving rise to forms which remain sterile in man, known as Grassi's gametes. These latter forms, taken into the stomach of the *Anopheles* with the blood she draws from an infected man, develop into sporozoa, and these in turn form sporozoites, delicate filaments which find their way to the salivary glands of the *Anopheles*. The saliva anointing the lancet of the *Anopheles* carries the infection to the next victim bitten. In East and Central Africa experiments were made by Daniels which led him to believe that *Anopheles funestus* (Giles) is the chief agent in distributing malaria in that country, and that man is the only intermediate host of the malarial parasites.

A practical confirmation of the mosquito theory resulted from the labors of Low, Celli, Grassi, and the Red Cross of Italy, which demonstrated in 1901 that the use of the mosquito net and the draining of stagnant pools prevented malaria in individuals living in notoriously malarious countries. Covering the surface of stagnant water with a pellicle of crude petroleum suffices in many instances to kill the larvæ of the mosquito, and decrease of malaria follows. A solution of permanganate of potash, 1 to 1500, was found to be as effective, though not as cheap, as petroleum. It has been ascertained that goldfish may be used as the agent for the destruction of the larvæ of mosquitoes, as they eat them eagerly. Ducks are said to be even more efficient destroyers.

Extensive and important studies in New Jersey established the facts that the most abundant species of mosquitoes in that State, *Culex sollicitans*, breeds not only in brackish and salt water, but also in water that is 25 per cent more salty than ordinary sea water; that it does not breed in fresh water at all; that adult mosquitoes may be found in great abundance from 20 to 40 miles from their breeding places; and that mosquitoes occur from 5 to 15 miles off shore, over the open ocean, at points to which they have been carried by the wind. *Culex pungens*, next in abundance to *Culex sollicitans*, was found breeding in every place where water is not salt. The breeding time for these mosquitoes is late in the fall, and the adults hibernate.

The mosquito is also accepted as the means of transmission in the case of yellow fever. This theory was first advanced by Dr. Carlos Finlay, of Havana, in 1881. Reed, Carroll, Agramonte, and Lazear, who formed the commission appointed in 1900 by the surgeon-general of the United States army to investigate yellow fever in Cuba, proved that the mosquito serves as the intermediate host for the parasite of yellow fever, and that the disease is propagated only through the bite of this insect. *Stegomyia fasciata* is the mosquito that acts as host for yellow fever. The mosquito has a part also in the dissemination of leprosy. Kaposi has instanced a case of this disease, easily traceable to a mosquito bite. The experiments of Alvarez, as quoted by Carmichael, support this theory of mosquito transmission in leprosy. It is admitted without reserve that filariasis is transmitted by mosquitoes. Corroborative experiments and studies in the development of *filaria nocturna* were made by Low, of Rome, Italy, in 1901. He found active filaria embryos in the thoracic muscles of *Culex terriatus* between 12 and 24 hours after this mosquito had fed on a patient suffering from filariasis. In *Culex fasciatus* he found perfected filariæ in the head, neck, and proboscis. Elephantiasis has been transmitted by the mosquito. Its parasite was found in their bodies by the investigations of the Liverpool School of Tropical Medicine in Nigeria, Africa, in 1900.

The *fly* is properly charged with the transmission of many diseases. Nuttall fed the bacillus of the bubonic plague to flies and ascertained that they could convey the infection. Carmichael believes that leprosy is communicated by the same insect. The bacilli of anthrax (malignant pustule) have been found in flies. Grassi, of Milan, and, much later, Beale, of Calcutta, demonstrated that cholera was a fly-borne disease, and the germs of typhoid fever are carried by the same insect which swarms over fæcal evacuations. Hervieux, of France, ascribed the spread of smallpox to flies. Simond's investigations, carried on during 1899, together with the results obtained by Yersin, favor the theory of the spread of plague from rat to man by the *flea*. Bœck charges the *itch mite* (q.v.) with being an active agent in the spread of leprosy. Smith and Kilbourne established the fact that the *tick* propagates Texas fever among sheep.

Kobler's experiments led him to accuse the *ant* of carrying the infection of bubonic plague to man. From a sheep that died of anthrax in Cyprus in 1901, ants transmitted the fatal disease to a woman in a cottage near by. *Roaches* are believed to carry typhoid fever in the same way as do flies. The *bedbug* is responsible for the spread of leprosy (Carmichael), cancer (Moran), tuberculosis (Denevre), and relapsing fever (Titkin). Bubonic plague (q.v.) is carried by the rat flea, and sleeping sickness (q.v.) by two species of the tsetse fly (*Glossina palpalis* and *G. morsitans*). Dutton has proved that the house flea (*Pulex irritans*), the bedbug, the American cockroach (*Periplaneta americana*), and fruit fly may and often do transfer typhoid fever and other diseases. Typhus fever (q.v.) is now believed to be carried by the louse.

Insects, it is seen, propagate diseases in two ways: (1) as carriers, bringing infection to a wound or to food and drink on the surface of their bodies, after crawling over an infected spot, or bringing the infection in the form of bacilli in their intestinal tracts; (2) as intermediary hosts, bringing to the victim the infection in the fluids of their bodies and inflicting wounds through which the poison is introduced into the body of the victim. The mosquito is a true intermediary host. Flies are examples of carriers. Coplin, of Philadelphia, experimenting in the line of the researches of Sangres, caused roaches, flies, and bedbugs to walk over cultures of various disease germs and then to walk over sterile agar plates, many hours later, having been kept in the meantime in large jars, under as natural conditions as possible. Examinations of the agar plates made subsequently showed active cultures of the various bacilli of infection. The feet, the ventral portion of the body, and the wings of insects carry infection and plant the disease organisms in rows and small colonies throughout the surface of the sterile plates. Forty-eight hours of continuous infectivity was shown in the case of many disease germs thus transmitted. In one case the typhoid bacilli carried on the body of a roach retained their virulence for 96 hours.

But one germicide has proved of avail in disinfecting bacteria-laden material, and this is formaldehyde. The great difficulty in rendering harmless the insect carrier of disease is easily appreciated, and the only effective way of dealing with such carriers is to destroy them, their hosts, and breeding places.

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INSID'IOUS FLOWER BUG. A minute heteropterous insect (*Triphleps insidiosus*) common in the United States. It belongs to the family Anthocoridæ, closely related to the bedbug family (Cimicidæ), is black with yellow-tipped wings, and is often found in flowers. It is predatory in its habits, feeding upon other insects, is a voracious foe of plant lice, lace bugs, and other minute creatures, and an important enemy of the grapevine phylloxera.

INSIG'NIA, MILITARY. See MILITARY INSIGNIA.

IN'SOLA'TION. See HEAT STROKE.

INSOL'VENCY (from *insolvent*, from *in-*, not + *solvent*, from Lat. *solvere*, to solve, relax, from *se-*, apart + *luere*, Gk. *λύειν*, *lyein*, to loose). As a legal term, the legal status (1) of any one who cannot pay his debts as they mature; or (2) of one who has been brought within the jurisdiction of the insolvency laws. The earliest insolvency statute in England is c. 20 of 22 and 23 Car. II, passed in 1670. Its preamble recites: "Forasmuch as very many persons now detained in prison, are miserably impoverished, either by reason of the late unhappy time, the sad and dreadful fire, their own misfortunes, or otherwise, so as they are totally disabled to give any satisfaction to their creditors, and so become, without advantage to any, a charge and burden to the kingdom, and by noisomeness (inseparably incident to extreme poverty) may become the occasion of pestilence and contagious diseases, to the great prejudice of the kingdom." It is apparent from this preamble that the cruel fiction that a person who failed to pay a judgment debt was guilty of a breach of the peace, and the inhuman practice, resulting therefrom, of arresting and imprisoning the debtor, had worked badly and threatened to produce a pestilence. Hence parliamentary interference, making provision for debtors' securing release from "durance vile," upon surrendering any remnant of property they might have and making an oath to their poverty and their honesty. This was the beginning of remedial legislation, which within the last century has resulted in abolishing imprisonment for honestly contracted debts.

From 1670 to 1861 insolvency statutes, insolvency proceedings, and insolvency courts were entirely distinct from *bankruptcy* (q.v.) statutes, proceedings, and courts. The leading features of English bankruptcy laws were: (1) that they applied to traders only; (2) that proceedings under them were instituted by creditors for the compulsory distribution of the debtor's assets; (3) that such proceedings resulted in the discharge of the honest bankrupt from his debts. On the other hand, insolvency statutes (1) applied to all debtors; (2) proceedings under them were voluntary, i.e., were instituted by the debtor; (3) they might result in discharging the insolvent from jail, but they left his future acquisitions liable for old debts.

In 1861 the bankruptcy statutes were extended to include nontraders, and insolvency proceedings were abolished. Since that date insolvency, as distinguished from bankruptcy, means that a man has ceased or is unable to pay his debts as they come due. In the United States the sharp distinction between the two terms which existed in England until 1861 has never been sanctioned by either legislative or judicial usage. Speaking in general terms, we may say that the term "bankruptcy" has been restricted to proceedings had under the several bankruptcy acts passed by Congress and to the status of the debtor who took advantage of those acts, while the term "insolvency" describes the condition of a person who is unable to pay his debts or one who has come under the operation of the State statutes relating to such persons. A third use of the term "insolvent" to describe one whose entire estate taken together is not sufficient to discharge his indebtedness appears in the present United States Bankruptcy Act.

Even prior to the Revolution the Colonies were accustomed to legislate for the relief of debtors; but their statutes, although providing at times for the discharge of the insolvent from all his debts, after the manner of bankruptcy statutes in the mother country, were called insolvency statutes. After the adoption of the Federal Constitution, with its grant of power to Congress to establish uniform laws on the subject of bankruptcies, it was natural that the Colonial nomenclature should be retained by the States, even when adopting comprehensive bankruptcy statutes, such as have existed for many years in a number of the States. These laws were not abolished by the Federal Statute of 1898; but their operation, so far as it conflicts with that of the Federal law, is suspended.

State statutes relating to insolvency have been very divergent and from some points of view very unsatisfactory. They may be divided roughly into five classes, although in some States statutes falling within two or more of these classes will be found: (1) simple insolvency laws; (2) statutes regulating general assignments for the benefit of creditors; (3) those providing for the distribution of the estates of insolvents for their discharge from debts, in voluntary proceedings only; (4) those providing for discharge from debts under general assignments; (5) true bankruptcy statutes, applying to all debtors and providing for voluntary and involuntary proceedings. As the States are prohibited from passing any law impairing the obligation of contracts, and as, therefore, State legislation cannot operate to discharge a debtor from liabilities to creditors outside the State, without their consent, such legislation can never perform the functions of a Federal bankruptcy law. Consult: J. L. Bishop, *Treatise on the Law Relating to Insolvent Debtors* (New York, 1895); E. C. Brandenburg, *Law of Bankruptcy* (3d ed., Chicago, 1903); S. W. Jones, *Treatise on Law of Insolvent and Failing Corporations* (Kansas City, 1908). See BANKRUPTCY; DEBTOR.

INSOM′NIA (Lat., sleeplessness), or SLEEPLESSNESS. A condition caused by cerebral excitation, mental or physical exhaustion, toxic conditions (as from alcohol or from disordered digestion), grief, etc. It frequently accompanies febrile conditions. It is best treated by attacking and removing the cause, if this can be ascertained. Hygienic measures, as hot baths, massage, ingesting hot food, applying heat to the extremities, ventilating the sleeping apartment, etc., should be tried before resorting to drugs to overcome the condition. See HYPNOTICS; SLEEP.

INSPEC′TION (Lat. *inspectio*, from *inspicere*, to look in, from *in*, in + *specere*, to look; connected with Gk. *σκέπτεσθαι*, *skeptesthai*, Skt. *spaś*, *paś*, to look, OHG. *spehōn*, Ger. *spähen*, to spy). Military inspections in the United States army include every branch of military affairs. They may be divided into six general classes: 1. The *ceremony of inspection*, or simply "inspection," by which is meant the formal assembling of troops as prescribed in the drill regulations of the arm of the service to be inspected. Such inspections include a detailed examination of the arms, equipments, animals, and of the general appearance of the individuals and units composing the command. These inspections are usually made weekly and monthly by commanding officers of organizations and at irregular intervals, usually yearly, by officers of the inspector general's department. 2. *Annual tactical inspections* are made by brigade and division commanders, assisted by inspectors general of the arm to be inspected whenever practicable. Such inspections are made under field conditions and have for their object the determination of the preparedness of organizations for war service and the capacity of officers for the exercise, in the field, of command appropriate to their rank. Subjects included are camping, sanitation, marching capacity, cooking, the supply service, field fortification, firing problems, and field orders issued in the solution of a tactical problem simulating war. 3. *Annual garrison inspections* are conducted by officers of the inspector general's department during the period of garrison training, to determine the state of discipline and efficiency attained in garrison training and administration. This inspection includes an investigation of the money accounts of all disbursing officers. 4. *Special inspections* are made by inspectors general, of soldiers' homes, armories, arsenals, military academy and other service schools, depots, general hospitals, recruiting stations, prisons, cemeteries, money accounts of the War Department, army transports, etc. 5. *Militia inspections* of the organized militia are made by regular officers detailed for that duty by the department commander. 6. *Inspections of military civilian schools and colleges* at which a regular officer is on duty are made by selected officers of the general staff of the army.

INSPEC′TOR GENERAL. A military officer charged with the duties and responsibilities of inspection. In the United States army the title is officially applied to *all* the officers of the inspector general's department, no matter what their grade. The organization in 1914 included the inspector general of the army, with the rank of brigadier general, three inspectors general with the rank of colonel, four with the rank of lieutenant colonel, and nine with the rank of major. In addition to these there were four acting inspectors general of the following rank: one colonel, one lieutenant colonel, and two majors. Total, 21 inspectors general, including the inspector general of the army. All but three of the officers mentioned are detailed from the line of the army for a period of four years. Upon the retirement of the three permanent officers the entire department will be composed of detailed line officers. Normally inspections are made by officers of the arm of the service being inspected. Officers of this department are responsible for the proper inspection of troops, including their strength, efficiency, and equipment; stations; accounts of disbursing officers; irregularities or misconduct of officers; attempts to defraud the government; all matters pertaining to the supervision of the accounts of receipts and expenditures in connection with the National Home for Disabled Volunteer Soldiers; all depots, armories, arsenals, and public works of every kind under charge of officers of the army, except works of engineering conducted under the direction of the Secretary of War, and supervision of the chief of engineers. Inspections of engineering works cover the business and military administration and methods and do not include the scientific or technical character of the work. Inspectors general and acting inspectors general are required, in addition to the above duties, to make such suggestions as may appear to them practicable for the correction of any defect that may come under their observation in any command to which they may be assigned. When assigned to a military command, an inspector general is under the immediate direction of its commanding general; when not so assigned, he is under the orders of the War Department. They are also expected to designate from time to time the articles which in their opinion should be procured and kept for sale by the quartermaster corps to officers and enlisted men. The annual inspection of the Soldiers' Home in the District of Columbia is made by the inspector general of the army in person. In the English army there are an inspector general of the home forces and an inspector general of the oversea forces. The former officer has under him an inspector of cavalry, of horse and field artillery, of garrison artillery, of engineers, and of infantry. He has also under him general officers commanding territorial districts, and other commands, who personally or through the officers of their staff inspect the component parts of their commands. In Germany, France, and continental Europe generally, the duties of the inspector general's department are carried out by the general staff of the army or of a territorial district. For further particulars, see ARMY ORGANIZATION; INSPECTION.

INSPECTORSHIP DEED. In English law, a deed executed between an insolvent person and his creditors, whereby they accept a part payment and allow the insolvent debtor to carry on the business under their supervision with a view to further payments. It derives its name from the fact that certain of the creditors named in the deed, as inspectors, assume the duty of supervising and controlling the subsequent management of the business by the debtor. The practice is not common in the United States. See INSOLVENCY.

IN'SPIRA'TION (Lat. *inspiratio*, from *inspirare*, to inspire, from *in*, in + *spirare*, to breathe). A theological term used to denote the divine action upon men by which the Bible has been produced. In its most general use it designates the whole of this process; but often a distinction is made between revelation and inspiration, according to which *revelation* denotes that divine activity by which the knowledge of the truth is supernaturally conveyed to the minds of chosen men, and *inspiration* that divine guidance by which the same men were qualified to write the existing Bible. Employed in the latter sense, the inspiration of the Scriptures signifies a special divine authority in the books of Scripture as depositories of religious truth. Properly inspiration (breathing in) is a personal term and applies to the influence of one person upon another. Divine inspiration, the influence of God upon man, is a term of far wider application than merely to the writers of the Bible. Its use in regard to a book, like the Bible, is secondary. It means that the writers were so divinely guided that they wrote words of special religious significance. The doctrine is not limited to the biblical religions. Brahmanism believed in the inspiration of the Vedas; Zoroastrianism, of the Avesta; and Mohammedanism, of the Koran—the last holding a more extreme theory than any church has ever propounded regarding the Bible.

The beginning of biblical inspiration was in the feeling of the prophets that God was speaking through them. From the writings of the prophets the conception extended to other books sacred for any reason—to the Psalms, used in worship, and at last to the religious histories of the nation and books of religious wisdom. Before the rise of Christianity the method of inspiration was already conceived in a mechanical way, as though man were only the passive recipient of a supernatural message from God. Christianity inherited its idea from Judaism. Tertullian and Athenagoras speak of the prophets as being lutes or lyres under the hand of God. The idea that inspiration preserved the Scriptures from all error is found in Augustine; but Chrysostom, Jerome, Theodore of Mopsuestia, and others recognize human elements in Scripture. Even in the time of the Reformation there was little discussion of this subject. In the writings of Calvin and Luther passages representing contradictory views can be found; but while both held to the fact of inspiration, Calvin recognized, and Luther emphasized, the human elements in the Bible. Neither held that inspiration involved perfect historical accuracy; nor has any Catholic or Protestant creed, except the Second Helvetic (see CREEDS AND CONFESSIONS), so affirmed. Various theories have been held by individual theologians.

1. The theory of *plenary* or *verbal* inspiration is that the whole letter of Scripture is inspired, that the words were immediately dictated by the Holy Spirit and are literally the words of God and not of man. The several writers of Scripture were nothing more than the penmen of the Divine Spirit. The inspired document is throughout faultless, equally in its form and in its essence, in its spirit and its letter. It admits of no gradation; all is equally divine, and therefore equally accurate, whether it relate to some ordinary fact or to some truth of the supernatural life. Those who hold this view do so on the a priori ground of necessity; such infallibility is held to be implied in the very idea of a revelation of the divine will; while those passages which seem inconsistent with the facts of science or of history, or with other parts of the Bible itself, admit, it is maintained, of satisfactory explanation. It is objected to this theory that it does not take account of the facts of the Bible, which show no such perfection; and that it would need to add an infallible interpretation, to insure the perfect knowledge of truth.

2. The theory of *dynamic* inspiration is that the writers of the Bible were so filled with the divine power that, while perfectly free in the employment of all their faculties, they were preserved from all error in conveying the truth which the Bible was written to convey, viz., that pertaining to the way of salvation. This theory has numerous forms, and any statement of it would fail to satisfy many who adopt its general conception of inspiration. Its most important form may be summarized in the definition, the inworking power of God preserved the writers of the Bible from all error in matters of faith and morals, but not necessarily from all error in matters of history and science. This theory attempts to meet the facts of the biblical narratives, as seen by modern biblical study. It is found that the Gospels in their accounts of the same event differ in various points. Not only is there an entire ignoring of scientific facts, but often statements which are inconsistent with them. The use of the Old Testament in the New is inaccurate and often violates principles of exegesis which modern scholars would feel compelled to observe. None of these errors, however, affect the main current of the biblical doctrine. They show that men wrote the Bible acting naturally as men act and under human limitations, but they do not impair the value of the Bible for its great purpose of bringing men into harmony with God.

3. A third theory is that of the school of Ritschl. It may be said to deny inspiration as a separate operation and lay all the emphasis upon revelation. We must maintain the supernatural communication of divine knowledge to men, it is said; but after they have this knowledge, they are left to communicate it according to their natural abilities, and the books they write are committed to the stream of history

to be borne where the providence of God may guide them, as all other books are. Thus, the human element in the books is large, and no infallibility of any sort, even in matters of faith and morals, is to be affirmed; but the truth of God is there as in no other book in the world. The evidence for the element of revelation in the Scriptures lies in the fact that the highest ideas which the mind of man has conceived have come from the Bible alone.

4. Another theory is based upon the facts of evolution as seen in history. It dispenses with not only inspiration but even special revelation. The causes operating in religion are, like all the causes recognized by evolution, immanent. It is not the supernatural enlightenment of chosen minds which we find here, but that enlightenment which comes in the course of all development under the operation of the laws of variation and the operation of environment, and which has given us the steam engine and other instruments of progressive civilization. In this human progress lies the real divine revelation. Thus, the Bible is a purely human book, but it is the greatest of all human books and should retain its place at the foundation of our religious structure.

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INSPIRED TINKER, The. A name sometimes applied to John Bunyan.

IN'STALLA'TION (Lat. *installatio*, from *installare*, to install, from *in*, in + *stallum*, place, from OHG. *stal*, Ger. *Stall*, AS. *steall*, Eng. *stall;* connected with Gk. *στέλλειν*, *stellein*, to send, and ultimately with Lat. *stare*, Gk. *ἱστάναι*, *histanai*, Skt. *sthā*, OHG. *stēn*, Ger. *stehen*, to stand). In the Anglican church, the ceremonial act or process by which a person presented and legally confirmed in a benefice is formally put into possession of his office, and by which he is fully empowered not only to exercise its functions, but to enjoy its honors and emoluments. The ceremonial form, as well as the name, differs according to the office which is conferred, as "enthronization" for a bishop, "induction" for a rector, etc. "Installation" properly regards the office of a canon or prebendary. (See Induction.) In the nonepiscopal churches installation is used for the ceremony by which a pastor elect is formally placed in his office.

IN'STANCE, Court of. The branch of the English Court of Admiralty which exercised all the jurisdiction of that court in matters triable under the ordinary or municipal law (q.v.). This included all classes of cases to which the jurisdiction of Admiralty extended, except "prize" cases, which involved international law, and for the trial of which the court required a special commission authorizing it to act as a prize court. The entire jurisdiction of the Admiralty Court was transferred to the High Court of Justice by the Judicature Act (q.v.) in 1873. The above distinction in the exercise of jurisdiction has never prevailed in the United States. However, the term is still employed in England and the United States to describe the kind of jurisdiction exercised in cases involving exclusively the municipal law. See Admiralty; Maritime Law; Prize Courts.

IN'STAURA'TIO MAGNA (Lat., Great Renewing). A great work on the reorganization of the sciences, by Francis Bacon (q.v.). Almost all his philosophical writings actually form part of this vast scheme, or were intended to be included in it.

INSTERBURG, in'stĕr-bụrk. A town of Prussia, in the Province of East Prussia, situated on the left bank of the Angerapp, about 60 miles east of Königsberg (Map: Germany, J 1). It has several old churches with fine wood carving, a castle, a Gymnasium, a museum of antiquities, and a seminary for female teachers. It manufactures linen, machinery, stoves, cement, fertilizers, and shoes. Raising horses is an important industry. Insterburg had its origin in a castle of the Teutonic Knights built in the fourteenth century. Pop., 1900, 27,287; 1910, 31,627.

IN'STINCT (Lat. *instinctus*, impulse, from *instinguere*, to impel, from *in*, in + **stinguere*, to prick; connected with Goth. *stiggan*, AS. *stingan*, to push). "Instinct is one of those historical concepts which has been overgrown by meaning. It is so incrusted with traditional significance that it is almost impossible to use it for the exact descriptive purposes of science" (Yerkes). The greatest source of confusion lies in the use of the term in two distinct disciplines. Instinct is subject matter for both biology and psychology, and the successful synthesis of the meanings derived from the two contexts can hardly be expected. In general, instinct may be said to be the characteristic by virtue of which a living organism acts in accordance with a fixed mode of behavior that is determined prior to the lifetime of the individual. Thus, instinct is simply inherited behavior and is opposed to habits (see Habit), which are acquired during the individual's life and may be based on its experience. Instinctive behavior is the sum total of inherited movements, but instinctive action implies the action consciousness and is a narrower term in that it is restricted to conscious instinctive movements, and a broader term in that it involves the psychological aspect of the action. Psychologically, the term "instinct" can refer only to the action consciousness involved (see Action).

Instinctive Movements. Biologically considered, any movement of which the form is inherited may be called instinctive. Thus, instinct includes both the unconscious reflex, like the wink or even the heartbeat, and also the more complicated conscious movements, like nest building in the bird or the behavior expressive of the maternal instinct in the human being. The instinctive character of a movement as inherited may be attested by any one of three marks.

1. Behavior performed in the same general way by all members of the species is instinctive. Thus, we find spiders spinning webs and birds building nests in much the same way for the given species, but with slight differences according to individual or external conditions.

2. Behavior is instinctive which meets a need of an individual who can have had no previous experience of the need or of its mode of satisfaction. The solitary wasp places within the cavity that it has made for its egg a particular kind of prey which subsequently serves as food for the larva, and seals both food and egg in the cavity. Then it leaves, never to return. The experience of the wasp cannot explain its anticipation of the need of the larva for food.

3. Behavior is instinctive which meets a racial need that is of frequent occurrence in the species, though it may not constitute a need for the particular individual. Spiders sometimes steady their webs by suspending a pebble from the centre, and a spider may take this course for the first time when there is no especial need for the additional stress. In the individual case, the instinct may even be at fault and may result in harm. The creature which, surprised by the hunter, remains motionless may not blot itself out against the background, but furnish an easy mark.

In a narrower biological usage, instinct is not defined merely as inherited movements, but is separated from the simpler innate movements —the tropisms, differential sensitivity, and, in the complex organisms, the reflexes. (See ANIMAL PSYCHOLOGY; TROPISM.) The instinct represents a complication of the tropic reactions, while it is further often asserted to involve consciousness. This tendency to shift to a psychological criterion is doubtless responsible, not only for much confusion, but also, to a great extent, for the attempt to limit the concept of instinct. A distinction can, however, be made on purely biological grounds.

1. In the first place, from this point of view, the instinctive movement, unlike the reflex, is that which involves the whole organism. The animal crouches in fear, advances in anger, disports itself in play. The reflex affects a single organ or member of the body.

2. The widespread nature of the reaction assures us that it must be *complicated*. Moreover, the stimulus is complex. As in the emotion (q.v.), the animal reacts to a total situation. The movements expressive of parental love may be aroused by the call of one's own child in distress; the same sounds from a phonograph will not bring out the response.

3. Finally, instinctive behavior is characterized by *variability*. It is subject to inhibition or reënforcement in the same manner as are other determinations, and it thus combines with other determining tendencies, innate and acquired, in the formation of habits. We are told that certain instinctive movements in the chick occur earlier "if imitation be not excluded." If this is true, it is probable that one instinctive tendency is facilitated by another. The instinctive behavior is touched off, not only by its proper stimulus, but also by other like stimuli, which involve undoubtedly similar nervous excitations. Instinctive behavior is also subject to specialization; it is liable to become "systematically organized about certain objects or ideas," so that a very specific stimulus replaces the more general one. Lastly, the instinctive movements are often transitory, appearing only at a definite period in the lifetime of the individual. Insects in the larval stage exhibit a whole group of instincts which are later replaced by an entirely different set, and in man the instincts of play and of sexual love follow a course of growth and decay in the individual lifetime.

Definite, inherited forms of response, adapted to the needs of the species, appear in all animal forms, and in this sense instinct may be said to be coextensive with animal life. Instinct, as a widespread, complicated, and variable movement, does not clearly occur in the animal scale below the earthworm. The highest development of instinct is found in the very complex behavior of the social insects. (See ANIMAL PSYCHOLOGY; ANT; BEE.) Among the vertebrates instinctive movements are numerous. In chicks, for example, we may note the following: pecking, walking, scratching body, preening down and feathers, stretching up and flapping wings, scratching the earth, squatting down and dusting body, scattering and crouching when alarmed, making the danger "churr." In man the instincts are very numerous, although they are less highly developed than in the insects, or at least less potent because of the greater plasticity of his nervous system. They include, on the one hand, movements which approximate the reflex: coughing, smiling, sneezing, swallowing, beating time to music; in the infant: sucking, biting, creeping, crying. There are, on the other hand, large general tendencies: the tendency which makes us take the world of perception as a world of real things; the empathic tendency, which makes us humanize our surroundings; the tendencies to imitate, to believe, to dichotomize. Certain movement complexes expressive of the emotions (see EXPRESSION, EXPRESSIVE MOVEMENTS) must also be considered instinctive.

The Instinctive Consciousness. Instinctive action implies an action consciousness, and it is to this consciousness that we must look for a psychological description of instinct. The instinctive action is in general like any other action, and its consciousness is of the form of every action consciousness. It is, however, primarily an organic consciousness. The widespread bodily reaction finds its echo in a mass of organic sensation. In this way instinct resembles emotion. It is apt to be highly affectively toned, as is usual with those consciousnesses which anticipate the satisfaction of an organic need. There is, in fact, no sharp psychological line of division between the instinct and the emotion. Fear, love, jealousy, rivalry, curiosity, pugnacity, repulsion, self-abasement, and so on have been called "instincts proper," but the names indicate emotive complexes equally well. If, in order to be psychological, we neglect the innate character of the determining tendency of the instinct, the instinct and the emotion appear in many cases to be practically identical. Both are predetermined consciousnesses, affectively toned and organic, set off by a total situation and following a given course.

The instinctive action, like impulsive action, may change upon repetition, degenerating into a "psychomotor" form or becoming enriched by association. The smile is an example of the former, the maternal instinct of the latter tendency.

A knowledge of the instinctive consciousness gives us a clew to the mental lives of those animals which are principally governed by instinct—the insects. In any given consciousness affective processes probably play initially an important rôle; yet we can hardly say that, in the average, these creatures lead highly emotive lives. For if we invoke the principle of analogy to show that the instinctive consciousness in the insect is, like that in man, similar to the emotive, we must also apply the principle still further and admit affective adaptation. The key to the insect consciousness lies, then, rather in the predominance of organic processes. The insect's experience must be a succession of nicely discriminated, complex, organic patterns, with intermittent flashes of true feeling. The insect, we might say, is "body conscious," where man is "object conscious."

Instinct and Intelligence. There is a popular belief that instinct is the peculiar property of the animal world and that in man it is replaced by reason. The animal acts "on instinct," but man "by reason." The distinction is not valid. We have already seen, on the one hand, how great a part is played by instinct in man; on the other hand, if intelligence (q.v.) is constituted by the individual's ability to profit by his own experience, one cannot deny intelligent behavior even to the lowest animal forms.

An attempt is also made to establish a hierarchy of actions. We are told of three grades of "mentality": the reflex action or tropism, the instinctive act, the act of reason. There seems to be little foundation, however, for the belief that intelligent action is in some way superior to instinctive. The one does not necessarily represent higher development than the other. The social insects are further advanced on the instinctive side than is man, who, conversely, represents a greater evolutionary development with respect to intelligence. Of the insects, Yerkes says: "To compare them directly in their mental life with the human being is difficult, for in some respects they are more remarkable than the two-year-old child, while in others they are hopelessly inferior. With reason one might claim that certain of the insects are psychologically superior to man and represent a stage in the evolution of mind which, although strikingly different, is more advanced than our own. Rather we may conclude that the social insects represent the highest development of mind in one direction; and man, the highest development in another direction." It is not even true that intelligence is necessarily more efficient than instinct. The instinctive response to a strange environment may be no more wasteful, no less well adapted, than the intelligent response to a new situation. Instinct implies fixity of the nervous system; intelligence, plasticity. The plastic system, as it undergoes adjustment, is wasteful to the extent to which it is out of adjustment—an intrinsic wastefulness, but a constantly diminishing one. The fixed response eliminates the waste of adjustment, but is constantly inefficient in the degree that it is unsuited to the particular environment.

Some writers believe that in every act instinct and intelligence are present as concurrent factors, separable only by abstraction. For Morgan instinctive behavior is "congenitally determined" and "practically serviceable on the occasion of its first performance." It is not, however, perfect, and is subject to modification by intelligence. Intelligence, he argues, is distinct from instinct with regard to meaning, for the instinctive process in its first occurrence possesses "primary meaning," inherent in its mere succession. In the repetition of a process, on the other hand, there is an anticipation or "preperception" of phases, unrealized as yet, by a revival of the first occurrence—an anticipation which supplies "secondary meaning" and characterizes the behavior as intelligent. A vaguely conscious "preperception" may accompany the first occurrence of the performance; instinct and intelligence may thus occur together from the very first. Myers insists, on the contrary, that instinct and intelligence are merely different aspects of the single entity, "instinct intelligence." Instinct is characterized by mechanism, intelligence by finalism. "Instinct regarded from within becomes intelligence; intelligence regarded from without becomes instinct."

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IN'STITUTE (Lat. *institutum*, regulation, ordinance, from *instituere*, to set up, from *in*, in + *statuere*, to establish, from *stare*, to stand). In the land law of Scotland, the person who is designated in the instrument creating an entail (q.v.), and so "instituted" as the tenant of the entailed estate. The persons in whom the estate thereafter becomes vested by descent are described as substitutes. See ENTAIL; ESTATE; FEE TAIL.

INSTITUTE OF FRANCE. The official name for a group of learned societies in France organized at different times, but having for their object the fostering of some special branch in literature, art, the sciences, or philosophy. At present the Institute comprises five distinct bodies known as (1) Académie Française; (2) Académie des Inscriptions et Belles-Lettres; (3) Académie des Sciences; (4) Académie des Beaux-Arts; (5) Académie des Sciences Morales et Politiques. The first three academies, dating as separate institutions from the seventeenth century, were abolished by the Convention on Aug. 8, 1793. Two years later, under the title of Institut National des Sciences et des Arts, there was established by the Directory an association for the promotion of arts and sciences, which was divided into the three following classes: (1) physical sciences and mathematics; (2)

moral and political sciences; (3) literature and fine arts. In 1803 Napoleon I reorganized the body, dividing it into four classes—mathematical and natural sciences, French language and literature, classical languages and literatures, and fine arts—and giving it subsequently the name of Imperial Institute of France. After the Restoration it was again reorganized (1816) into four academies, comprising the first four bodies enumerated above, to which was added in 1832 the fifth academy, the name of the whole being changed at the same time to Institut de France. The Institute has always enjoyed great prestige, even under the consular and Imperial régime. In his Egyptian campaign Napoleon put, at the top of his proclamations, "Bonaparte, General in Chief, member of the Institute"—"so as to be sure," said he, "to be understood even by the very drum boys."

Each academy in the Institute has its independent government and the free disposition of the funds allotted to it, while an agency and secretaries, the library, and the valuable collections of the Institute are common to the five. Among these collections one of the most important is that of the château of Chantilly, which was presented to the Institute by the Duke d'Aumale in 1886. It comprises a great library and a magnificent art collection. The general fund is managed by a committee of 10 members, two from each academy, under the presidency of the Minister of Public Instruction. The members, of whom there are in addition to the regular members, honorary members, corresponding members, and foreign associates, are all elected by ballot, and the election is confirmed by the public authorities. Each member receives an annual salary of 1500 francs, and the perpetual secretaries are given 6000 francs. An annual meeting is held on October 25, when public announcements are made of the award of important prizes.

1. The Académie Française was founded by Cardinal Richelieu in 1635. The letters patent were granted Jan. 29, 1635, but were not ratified by Parliament before July, 1637. It had its origin in a small group of literary men, who as early as 1626 were accustomed to meet at one another's homes for the purpose of exchanging their views on various topics in literature, art, and science. They met particularly in the home of Valentine Conrart, a rich and learned man. Richelieu, on becoming aware of the existence of this informal society, offered them the royal protection if they would hold their meetings in public; and the society, after much hesitation on the part of the members, was thereupon constituted as the Académie Française. From 1793 to 1816 the Académie Française, as such, did not exist. (See above.) Within two years from the date of its formal authorization the membership of the Academy had risen to 40, at which number it has since remained. The members are popularly spoken of as "immortals." From the original 40 only a few have come down to us in literature: Balzac, J. Guez; Chapelain; Gomberville; Vaugelas; Voiture. Richelieu wished the Academy to be the final authority on all questions pertaining to language and literature. As early as 1637 the Academy had to pass formal literary judgment. In 1636 Corneille had written the epoch-making *Cid*. Immediately the quarrel of the *Cid* arose; the chief critic of Corneille was Scudéry, who was supported by Richelieu. The quarrel waxed warm, and finally, at Richelieu's command, the Academy appointed a committee of three to thresh out the whole question. After some delay a report was drawn up by Chapelain and submitted to Richelieu. The manuscript underwent several revisions and was finally published in 1638 under the title of *Sentiments de l'Académie sur le Cid.* The special function, however, of the organization was the improvement and conservation of the French language. For this purpose, at the suggestion of Chapelain, work was begun on a dictionary of the French language, which, however, did not see the light till 1694. (There have been seven editions of the dictionary—1694, 1718, 1740, 1762, 1798, 1835, 1878.) The original purpose of the Academy has not been forgotten. At the present day its chief business is still the revision of the *Dictionnaire de l'Académie Française;* but as a matter of fact in the intellectual world of France the French Academy holds a much higher rank than that of a mere lexicographical bureau. From an early date admission to the French Academy was sought as an honor, and for more than a century an election to a seat among the 40 "immortals" has been considered as the crowning glory to a successful literary career. The manner of election to the Academy has been changed. To-day the candidate who thinks that he has a chance presents his candidacy, and after an obligatory visit to all the members (called *visite académique*) he is nominated, and if elected it is by "absolute majority." Often the election is deferred when three ballots have shown no election; Casimir Delavigne, e.g., was elected only at the third attempt. At the general meeting, open to the public, the candidate about to become "immortal" is presented by a member of the Academy, who has been named his sponsor, or parrain. In his speech the sponsor sometimes, in a clever manner, criticizes rather harshly the prospective academician. When the candidate has undergone this baptism of eloquence with all the good grace at his command, his duty is presumably to eulogize and sometimes to criticize with veiled modesty his predecessor who sat in the "armchair" that he is about to occupy. By tradition a vacancy is filled from the ranks of the particular field that the late incumbent occupied. The Academy has laid itself open to reproach for a certain pettiness of spirit in shutting its doors on some of the greatest men in the history of French literature. The critics of the Academy have taken keen pleasure in counting the obscure names of some members. However, if one takes the list as a whole, it does seem as though membership has been representative. Those men upon whom literary criticism has put its stamp of approval and who have not become academicians are said to sit in the forty-first "armchair." Thus, it is that in the seventeenth century Descartes, Molière, Pascal, Scarron, were not members, but we find Boileau, Corneille, Racine, and La Fontaine. In the eighteenth century we do not find Diderot, Condillac, Beaumarchais, or Rousseau; fortunately we see Montesquieu, Voltaire, D'Alembert, and Marmontel. It is harder to explain why we do not see the name of the only real great poet perhaps of that century, André Chénier. In the nineteenth century we find Lamartine, Hugo, Vigny, Cousin, Villemain, Sainte-Beuve, Guizot, Thiers, Lacordaire, Montalembert, Cuvier, and other important names. We do not find, however, Béranger, Gautier, Comte,

Stendhal, Balzac, Daudet, Maupassant, Goncourt, or Verlaine. The influence of the Academy for good or bad has been for a long time a mooted question. It has been accused of impoverishing the French language. There is some truth in that accusation, but the Academy has maintained a certain distinction of expression and purity of form which have been invaluable. Besides its work on the dictionary, the Academy has been mainly occupied with the awarding of prizes for literary competitions. There are as many as 23 prizes a year, of which 17 are *prix littéraires* and 6 *prix de vertu*. Among the more important prizes are one of 2000 francs, awarded to the best poem or essay on a given subject; the Montyon prize of 22,463 francs, given as a reward for the most heroic deed done by a native of France; and one of 21,940 francs, given to a native of France who has written and published a work having the most valuable application to the arts; the Gobert prize for the most important work on the history of France, as well as a large number of other prizes. Its annual public meeting is held in November. See ACADEMY.

2. The Académie des Inscriptions et Belles-Lettres was founded in 1663, by Colbert, and has 40 ordinary, 10 honorary, and 50 corresponding members, and 8 foreign associates. It has for its principal objects the study of medals, inscriptions, monuments, antiquities, and ancient and Oriental languages. It has various prizes at its disposal and publishes *Mémoires*. Its annual public meeting is held in November.

3. The Académie des Sciences was founded in 1666, by Colbert, and has 66 ordinary, 10 honorary, and 106 corresponding members, and 8 foreign associates. Its prizes include an annual sum of 3000 francs, given alternately, for the best discussion of a subject in mathematics and physics; the Montyon prizes, six in number, having an annual value of 44,845 francs; the Laland prize, given annually, for astronomical work; and several others. This Academy publishes *Mémoires*. Its annual public meeting is held in December.

4. The Académie des Beaux-Arts was founded by Mazarin in 1648, and the subjects of painting and sculpture, music, and architecture were added respectively in 1664, 1666, and 1671. It has 40 ordinary, 10 honorary, 10 foreign associates, and 40 corresponding members. Besides the prizes in painting, sculpture, architecture, engraving, and music, awarded to the pupils of the Ecole des Beaux-Arts and the Conservatoire de Musique, it has under its charge the publication of the *Dictionnaire général des beaux-arts*. It also conducts the examination for the Prix de Rome in the various arts. Its annual public meeting is held in October. See ECOLE DES BEAUX-ARTS.

5. The Académie des Sciences Morales et Politiques was restored in 1832, through the appeal of Guizot to King Louis Philippe, after having been suppressed in 1803, and has 40 ordinary, 10 honorary, and 60 corresponding members, and 8 foreign associates; it is divided into five sections and has for its chief purpose the discussion of mental philosophy, law and jurisprudence, political economy and statistics, general and philosophical history, and politics, administration, and finance. It has the Baujour, Faucher, Halphen, Bordin, and other prizes at its distribution. It publishes *Mémoires*, and its annual public meeting is held in December.

The academies forming the Institute of France meet regularly in the Mazarin Palace, which is on the left bank of the Seine, at the Quai de Conti opposite the Louvre, and their meetings are attended with much ceremony. From 1795 to 1806 the meetings were held in the Louvre Palace. Since 1806 they have been held in the present quarters. Consult De Franqueville, *Le premier siècle de l'Institut de France* (2 vols., Paris, 1895).

INSTITUTES, LEGAL. An ancient term derived from Roman usage for a treatise, usually but not necessarily, of a comprehensive character. Among the most famous nonlegal works bearing that title is the reformer Calvin's *Institutes of the Christian Religion*, published in 1536. Among the legal treatises known as Institutes the most celebrated are the *Institutes* of Gaius, probably the earliest commentary on Roman law, written in the second century of the Christian era, which was lost for many centuries but recovered in 1816; the *Institutes* of Justinian, a comprehensive treatise on the civil law prepared for the use of law students; and Coke's *Institutes*, in four volumes, comprising an elaborate commentary on Littleton's *Tenures* (known as "Coke upon Littleton"), commentaries on the more important of the English statutes, and a treatise on the English criminal law. The term is little used in modern times except in Scotland, where legal treatises are still published under the title of Institutes, as Erskine's *Institute of the Laws of Scotland*. See CIVIL LAW; GAIUS; JUSTINIAN; COKE, SIR EDWARD; COMMENTARIES.

IN'STITU'TIONAL CHURCH, THE. A cross-sectional split among the 150 sects in the United States has developed ritualistic and institutional tendencies in the churches. The ritualistic churches lay emphasis upon the efficacy of certain beliefs, forms, sacraments, and a limitation of functions, and appeal to the economically superior classes. The institutional church, on the other hand, demands activity, apparent results, the amelioration of the outward as well as of the inward life of its members; it reaches out for the reclaimables in the social-debtor class, and it is identified with social rather than distinctly religious movements. The name "institutional church" was first used by President Tucker, of Dartmouth College, and applied to Berkeley Temple, Boston. Ever since 1840 some of the English churches have been taking on new functions, but the new church movement in the United States dates back hardly to 1880, and as a recognized movement it is scarcely older than 1890. It had its origin in the same impulses which created the university settlement, Christian socialism, and the Salvation Army—a feeling that the churches were not reaching the masses, and that each community had much work to be accomplished which could be done by the Church. The object is distinctly humanitarian. The institutional church becomes the centre and inspiration of the daily lives of its members, to whom it ministers according to their immediate needs, and has, as a result, reabsorbed certain functions (educational, medical, charitable) which had been assumed by the state and other organizations since the Roman Catholic church ceased to be the universal Church.

The characteristics of the institutional church are, in general, an adoption of secular methods. The platform of the Institutional Church League states that it "stands for open church doors for every day and all the day, free seats, a plurality of Christian workers, the personal activity of all Church members, and a ministry to all the community through educational, reformatory, and philanthropic channels." The organization of such churches is very complete. The numerous committees have definite duties, such as welcoming strangers, house-to-house canvassing, visiting members, and superintending work of different kinds. The finances are placed in competent hands and managed upon business principles. The ushers for church services are carefully chosen. Subpastors, deaconesses, sisters, and nurses carry on certain features of the work. The distinctly religious work consists of attractive services; music, frequently by large choirs or choruses; well-organized Sunday schools; pleasant Sunday afternoons; prayer meetings with special features; open-air meetings in summer; and the encouragement of helpful associations, such as men's Sunday evening meetings, the brotherhoods of St. Andrew and of Andrew and Philip, and Christian Endeavor societies. The secular work aims at educational, social, and physical improvement. Some churches have established special schools and colleges, which give an opportunity to obtain or to supplement a rudimentary education; industrial classes are maintained; lectures, illustrated and university extension, are given; literary and debating clubs are encouraged; and provision is made for libraries, reading rooms, and recreation rooms, with billiards, bowling alleys, and games; gymnasiums, swimming pools, military drills, and athletic teams. The philanthropic work includes employment bureaus, aid to worthy poor, wood yards, dispensaries, hospitals, crêches, penny provident funds, and personal efforts to reach the vicious or intemperate. When funds are sufficient, special buildings have been constructed.

The denominations especially engaged in this work are the Episcopal, Congregational, and Baptist, although there are a number of Presbyterian, Roman Catholic, Unitarian, and Methodist churches which make use of the same methods. Some of the prominent institutional churches are: Ruggles Street Baptist and Parker Memorial, of Boston; Fourth Congregational Church, of Hartford; St. George's, St. Paul's, St. Bartholomew's, and Judson Memorial, of New York; Tabernacle, or People's Palace, of Jersey City; Grace Church (The Temple) and Bethany Church, of Philadelphia; Pilgrim Church, of Cleveland; Ninth Street Church, of Cincinnati; Plymouth Tabernacle, Institute, and People's College, of Detroit; People's Church, of St. Paul; the Tabernacle, of Denver; and, one of the oldest of all, Plymouth Church, of Indianapolis.

The Open and Institutional Church League was organized in New York in 1894. The League has given aid and counsel by correspondence; it published for three years a magazine, the *Open Church*, and it has held conventions in various cities. At present the League is doing little active work; but its secretary, in connection with the Federation of Churches in New York, has organized the National Federation of Churches and Christian Workers, which, in 1905, called a conference of the principal American Protestant churches to formulate a plan for united action upon matters of common interest, among them the prosecution of social work. The principles of the League have taken a strong hold on Church life, and many churches are adopting institutional methods.

Bibliography. Thwing, *The Working Church* (New York, 1888); Woods, *English Social Movements* (ib., 1891); Josiah Strong, *New Era* (ib., 1893); Mead, *Modern Methods in Church Work* (ib., 1897); A. R. Burr, *Russell H. Conwell, Founder of Institutional Church in America* (Philadelphia, 1905); Hodges and Reichert, *Administration of an Institutional Church* (New York, 1906); Rauschenbusch, *Christianity and the Social Crisis* (ib., 1907); id., *Christianizing the Social Order* (ib., 1912); Thwing, *The Working Church* (ib., 1913); Ede, *The Clergy and Social Service* (Milwaukee, 1913); Forbes, *Social Ideas of a Free Church* (Boston, 1913); Protestant Episcopal Church, Joint Commission on Social Service, *Social Service at the General Convention of 1913* (New York, 1914).

INSTITUTO HISTORICO E GEOGRAPHICO BRAZILEIRO, ên′stê-tōō′tô ê-stŏ′rê-kô â jä′ô-grä′fê-kô brä′zê-lyä′rô (Portug., Brazilian Historical and Geographical Institute). A society founded at Rio de Janeiro in 1839. Its organ, the *Revista Trimensal*, is devoted to the publication of historical and geographical documents.

IN′STRUMENT (Lat. *instrumentum*, tool, from *instruere*, to construct, from *in*, in + *struere*, to build). A term of law to describe any formal written document by which legal rights are created. Thus, a deed of conveyance, a last will and testament, a memorandum of agreement, a promissory note, a bill of lading, a bond, a mortgage, are all legal instruments; but the term is not properly applicable to an entry in a book of account, or to a memorandum made for the sake of evidence or for perpetuating testimony.

IN′STRUMEN′TALISM. A term applied in philosophy to a variety of pragmatism (q.v.) developed by John Dewey (q.v.) and his former colleagues of the University of Chicago. According to instrumentalism, thinking is an organic function whose aim is to restore experience to its smooth flow when this flow has been arrested by the presentation of a problem. A problem is always due to an interruption of immediate unreflective experience, caused by the fact that the habitual or instinctive modes of reaction no longer fit the present situation that confronts the agent. One way of meeting the difficulty is to think, and this is the characteristic way taken by intelligent beings. Intelligent beings are so called because they resort to this method when in difficulties. Thinking, or the experience of ideas, is the formation of plans of action, action not being restricted to overt bodily behavior, but extended to any reaction that is made to a situation. Plans of action are necessary when habitual action or instinctive action is not able to cope with the predicament in which the experient finds himself. Every idea that he entertains in such a contingency is a possible plan to escape the difficulty. Every idea means the presence of its object, but is itself a kind of presence of its object; for there are two kinds of presence. An object may be present as present or it may be present as absent. "We must not balk at a purely verbal difficulty. It suggests a verbal inconsistency to speak of a thing present as absent. But all ideal contents, all aims (i.e., things aimed at) are present in just such fashion. Things can be presented as absent, just as they can be presented as hard or soft, black or white, 6 inches or 50 rods away from the body. The assumption that an ideal content must be either totally absent or else present *in just the same fashion* as it will be when it is realized, is not only dogmatic but self-contradictory. The only way in which an ideal content can be experienced at all is to be presented as *not present in the same way* in which something else is present, the latter kind of presence affording the standard or type of *satisfactory* presence. When present in the same way, it ceases to be an ideal content. Not contrast of bare existence against nonexistence, or of present consciousness over against reality of our present consciousness, but of a satisfactory with an unsatisfactory mode of presence, makes the difference between the 'really' and the 'ideally' present." In other words, in our experience some things are present in a way which is immediately satisfactory, and some are not. The difference between them is an immediate fact, just as much experienced as anything else. When experience does not run smoothly, in thinking beings there arises in experience an object present as absent, and this object is immediately there, but there in an unsatisfactory way. The subsequent conversion of this unsatisfactory presence into a satisfactory presence is a matter of the eventual course taken by the experience. The idea, or the unsatisfactorily present object, aims at its presence in a satisfactory fashion. This aim is its *meaning*, and if this aim is achieved, the idea *becomes true*. This aim is realized by the fact that the idea is an active reconstructive factor; it is an instrument for its own transformation into a satisfactory kind of presence. Knowledge is not a characteristic possessed by experience in any one cross section of it. It is a process. "An experience is a knowledge, if in its quale there is an experienced distinction and connection of two elements of the following sort: *one means or intends the presence of the other in the same fashion in which itself is already present, while the other is that which, while not present in the same fashion, must become so present if the meaning or intention of its companion or yokefellow is to be fulfilled through the operation it sets up.*" Thus, this view regards ideas and knowledge as instrumental in the development of experience, and having exclusively such a function. Hence it is called the instrumental theory of knowledge, or, briefly, instrumentalism. Consult: John Dewey, *Studies in Logical Theory* (Chicago, 1903); William James, *Pragmatism* (New York, 1907); id., *The Meaning of Truth* (ib., 1909); John Dewey, *The Influence of Darwin on Philosophy* (ib., 1910). See EMPIRICISM; KNOWLEDGE, THEORY OF; PRAGMATISM.

INSTRUMENTAL MUSIC. A term applied to music performed exclusively on instruments, as distinguished from that performed by voices, or even voices with instrumental accompaniment. Even in ancient Greece purely instrumental music was known. In the sixth century B.C. Sacadas of Argos is said to have performed publicly on the *aulos* (flute) at the Pythian Games. In the same century Agelaus of Tegea won great distinction as a performer on the *kithara*. But instrumental music as performed by a number of instruments was unknown. The Greek orchestra served only to accompany the voices. Harmony being unknown to the Greeks, such accompaniment was nothing more than a performance of the vocal part in unison or octaves upon the instruments. With the use of stringed instruments played by a bow a new phase of instrumental music began. The *fiddle* was brought over from the Orient and soon became the instrument upon which the troubadours accompanied their songs. It was also adopted by the wandering fiddlers (*fahrende Spielleute*) of the Middle Ages. The oldest compositions written expressly for instrumental performance were dances. But the style of these is entirely vocal. It is during the sixteenth century that the first traces of an individual instrumental style are perceptible. It was the keyed instruments which contributed to a differentiation between the vocal and instrumental styles. As they were unable to produce sustained tones or chords, composers soon discovered that broken chords and figuration were better adapted to these instruments. Even in compositions for the organ this principle was adopted; and before long the new style of figuration, and rapid note progression, were also adopted for orchestral instruments. Three instruments have become prominent in the development of the instrumental forms, viz., the organ, violin, and pianoforte. The great organists took from the vocal style the fugue. The instrumental fugue reached its growth in the masterpieces of J. S. Bach, which to this day still are unrivaled. The violin and pianoforte developed the sonata form, which is regarded as the highest of all instrumental forms. The cyclical forms can be traced to two main sources, viz., the old dances and the Florentine musical drama. By uniting a number of dances (all in the same key) the *suite* originated. The older operas were opened by an instrumental prelude which originally was nothing more than a madrigal arranged for instruments. But soon a special instrumental composition took its place. The form of this *sinfonia*, as it was called, was taken from the aria, i.e., it had three parts, A, B, A, of which the third was a repetition of the first. Gradually the three parts were detached and appeared as separate movements. Composers paid special attention to the first movement, from which gradually the sonata form was evolved. A sonata was originally any instrumental work (chiefly performed on a keyed instrument with strings) as opposed to a vocal one. Then "sonata" was applied to a cyclical composition for piano. The great sonatists of the eighteenth century (though composing for the violin) retained the name. The form was finally established by Stamitz and filled with the loftiest contents by the genius of Beethoven. The symphony is nothing else than a sonata of large dimensions for orchestra. Trios, quartets, concertos, etc., are all sonatas for a particular group of instruments. Instrumental music today is divided into absolute and programme music. The former kind is music written for its own sake; the latter attempts to portray definite ideas according to a given programme. Consult: W. v. Wasielewski, *Geschichte der Instrumentalmusik im 16. Jahrhundert* (Leipzig, 1878); L. Torchi, *La musica instrumentale in Italia nei secoli 16, 17, e 18* (Turin, 1899); W. J. Henderson, *Orchestra and Orchestral Music* (New York, 1899); D. G. Mason, *Orchestral Instruments and What they Do* (ib., 1909); H. Botstiber, *Geschichte der Ouvertüre und der freien Orchesterformen* (Leipzig, 1913).

See Cyclical Forms; Overture; Programme Music; Sonata; Suite; Symphony.

IN′STRUMENTA′TION, or Orchestration. The art of arranging the parts of an orchestral composition for the various instruments. Although from the beginning of the sixteenth century composers wrote for various combinations of instruments, instrumentation has become a real art only in the last half of the eighteenth century. The Gabrielis, e.g., employed violins in their instrumental works, but had no idea of the true character of this instrument. They used it only, like the trombones, for sustained notes. Even the instrumentation of Bach and Handel is very primitive. Gluck seems to have been the first to use the various instruments with a conscious purpose and a knowledge of their peculiar character. Haydn and Mozart made scarcely any advance in instrumentation over Gluck. In the works of Beethoven we find for the first time each instrument speaking its own language, and with him a new epoch of instrumentation may be said to begin. Weber accomplished for the opera orchestra what Beethoven had done for the symphony orchestra. In the works of Wagner and Berlioz instrumentation reached its culmination as far as then existing instruments are concerned. Quite independent of each other, these two masters discovered every conceivable combination and effect. Wagner even had special instruments (tubas) constructed for his *Ring des Nibelungen*. By increasing the number of the wood and brass choirs and by introducing new instruments, especially the celesta and heckelphone (qq.v.), Richard Strauss was enabled to advance even beyond Wagner on the merely technical side. Just as there is a special style of writing for the pianoforte (*Klaviersatz*) so there is also one for the orchestra (*Orchestersatz*). It is not sufficient for a composer to know thoroughly the compass and peculiarities of each instrument. Effective instrumentation requires also the proper distribution of the separate tones of a chord among the various instruments. Thus, if a composer should write the C major chord for trombones in successive thirds, *c*, *e*, *g*, the effect would be a confused mass of sound; whereas the proper effect would be obtained by writing *c*, *g*, *e′*. The science of instrumentation teaches the pupil the compass and peculiarities of the different instruments as well as their combinations. But talent for instrumentation and orchestral writing is independent of purely creative talent, although all great composers since Beethoven, with the one notable exception of Chopin, have been masters of the orchestra. The best works on instrumentation are those of Marx, Lobe, Prout, and especially Berlioz* (translated into German and enlarged by F. Weingartner) and Gevaert. Consult F. Volbach, *Das moderne Orchester in seiner Entwickelung* (Leipzig, 1910). See Orchestra; Score.

IN′STRUMENT OF GOVERNMENT, The. A written constitution for the Protectorate in England, set forth on Dec. 16, 1653. Since Jan. 15, 1649, the Agreement of the People (q.v.) had been nominally in force, its provisions being only partially carried out, but there was urgent need of some effective guaranty of civil liberty. The instrument provides for a constitutional government, administered by a Lord Protector, and a Parliament of a single house. An elective assembly is to be summoned on the 3d of September, 1654, and thereafter once in every third year. The distribution of county and borough seats in England and Wales is based on the schedule provided in the Agreement of the People, although there are important changes. For the first time provision was made for a parliamentary union of England, Ireland, and Scotland. With the exception of those who had engaged in the war against the Parliament since 1641, or in the Irish rebellion, or professed Roman Catholicism, the franchise and the right of being elected are conferred upon "persons of known integrity, fearing God, and of good conscience, and being of the age of twenty-one years," if seised or possessed of real or personal estate to the value of £200. There is no provision for the borough franchise, that being left apparently to the existing custom of each place. No Parliament was to continue longer than three years, and no Parliament was to be dissolved within less than five months after it was first convened without its own consent.

The extended powers of the Protector in foreign, military, and civil affairs are limited by the Parliament and the Council of State. A council of 15 members is appointed in the instrument itself. Other members may be added, but the number may never be more than 21 nor less than 13. Councilors are to hold office during good behavior. To fill a vacancy in the Council the Parliament is to nominate six persons, the Council to choose two out of these six, and the Protector to appoint one of the two. By the instrument Oliver Cromwell is created Lord Protector for life. His successors are to be elected by the Council. A veto upon legislation is not granted the Protector. All bills passed by Parliament must be presented to him; and if his consent be not given within 20 days, they become laws, unless he can convince Parliament that his objections are sufficient reason for rejection or that they are contrary to the Instrument. There is a responsible ministry. The "Chancellor, Keeper or Commissioners of the Great Seal, the Treasurer, Admiral, Chief Governor of Ireland and Scotland, and the Chief Justices of both the benches" are to be chosen by the consent of Parliament. All other appointments are apparently left in the Protector's hands. Religious liberty is guaranteed, except to "Popery or Prelacy," and to "such as, under profession of Christ, hold forth and practice licentiousness."

The Instrument of Government reveals the remarkable ability of its framers. The most serious defects are the lack of any provision for amendment and the failure to secure the national sanction. It broke down because the Parliament summoned under its provisions assumed the power of a constituent assembly. It was later amended in the *Petition and Advice* (q.v.). For the text of the Instrument, consult: Gardiner, *Constitutional Documents* (Oxford, 1889); and for discussion, id., *Commonwealth and Protectorate* (New York, 1894–1901); Masson, *Life of Milton*, vol. iv (London, 1873–94); Jenks, *Constitutional Experiments* (ib., 1891); Inderwick, *Interregnum* (ib., 1891).

INSTRUMENTS, Musical. See Musical Instruments.

INSUBRES, ĭn′sū-brēz. A Gallic people, a branch of the Ædui (q.v.), who crossed the Alps in the fourth century B.C. and settled in Italy north of the Po, between the rivers Adda and Ticinus and the Alps. Next to the Boii, they were the most powerful and warlike tribe found in Cisalpine Gaul at the time this region first came in contact with Roman arms, in 222 B.C. By 194 B.C. the Romans captured their capital, Mediolanum (now Milan), and reduced the tribe to submission—a victory which completed the Roman conquest of all the country lying between the Alps and the Apennines in the western part of Italy. Consult Heinrich Nissen, *Italische Landeskunde*, vol. ii (Berlin, 1902), and the article "Insubri," in Lübker, *Reallexikon des klassischen Altertums* (8th ed., Leipzig, 1914).

IN'SULÆ ÆO'LIÆ. See LIPARI ISLANDS.

IN'SULÆ LIPARÆ'Æ. See LIPARI ISLANDS.

IN'SULA'TORS. See ELECTRICITY; CONDUCTOR.

INSUR'ANCE (OF. *enseurance*, from *enseurer*, to insure, from *en*, in + *seur*, sure, from Lat. *securus*, free from care, from *se-*, without + *cura*, care). Insurance must be differently defined according to the aspect of it which is under consideration. Every person who embarks his capital in any kind of industrial activity is obliged to make accumulations to replace that part of it which is used up in the productive operation. Some of these accumulations are made to meet losses which are certain and definite both in time and in amount. Such accumulations should be large enough to replace the capital used up and no larger. Other accumulations are made to meet losses of a more or less uncertain character. Such accumulations are, for the entire group engaged in any line of industrial activity, larger than the losses, and the excess of accumulation over loss varies directly as the degree of uncertainty. The accumulations of an individual to meet uncertain losses constitute his insurance fund, and so far as he makes such accumulations he may be said to insure himself. From this point of view insurance is the accumulation of funds to meet uncertain losses.

One person whose property is exposed to a risk of some kind may be able to transfer that risk to another person for a consideration. The latter person undertakes to make good to the former any loss which he may suffer from certain specified accidental causes. The person guaranteeing the reimbursement for such accidental loss may be said to insure against the loss. From this point of view insurance is the transfer of an existing risk from the person exposed to it to another person or group of persons.

When one person merely assumes the risk of some other person, there is little or no social gain from the transaction. Whatever accumulation the former would have had to make if he had carried his own risk, the latter must make after he assumes the risk. The burden which the risk imposes on society remains unaffected. If, however, the risks of many individuals are brought together in a group, a new principle is brought into play. The uncertainty as to the amount of loss to be expected steadily diminishes as the number of risks included in the group increases. Thus an insurance company, which has assumed the risks of thousands of individuals, is exposed to much less uncertainty as to the amount of loss it will have to indemnify in a given period of time than any one of the individuals is as to the amount of loss he would suffer during the same period if uninsured. The total amount of loss which the company experiences increases as the number of risks it is carrying increases; but the proportion of the total loss which may be considered as certain steadily increases and the proportion of uncertain loss diminishes. For the company the only uncertainty is as to how much the actual loss will differ from the average loss, and by the well-known law of averages the percentage of variation between actual loss and average loss diminishes as the number of cases increases. Now the insurance company under competitive conditions makes its accumulations under the same conditions as the individual. To meet definite losses it accumulates only the amount of the losses; to meet uncertain losses it accumulates in the long run an amount in excess of the losses, and this excess varies with the degree of uncertainty. It will be seen, therefore, that the company can carry the risks of 100,000 individuals on a much smaller accumulation than would be made by the individuals if each were carrying his own risk. This reduction in the cost of carrying risks is one of the economic advantages of commercial insurance.

The second advantage arises from the diffusion of loss. While it is true that for the entire group of persons engaged in a particular industry accumulations to meet uncertain losses will exceed the amount of the losses, it is equally true that some will suffer loss in excess of their accumulations, while others will make the accumulations and escape the loss. In other words, while the group as a whole will make extra gains on account of the existence of risks, these gains will be unequally distributed among the members of the group. Those who suffer the loss will be seriously crippled financially if not actually ruined, while those who escape the loss will reap all the advantage. If, on the other hand, the members of the group are all insured, the system of premiums and indemnities diffuses the losses actually suffered among all the members of the group. This causes such losses to fall on the least important part of the capital of all instead of being concentrated on a few unfortunate individuals. In this way the economic evils caused by the accidental destruction of property are greatly modified. From the social point of view, therefore, insurance may be defined as an economic institution for reducing the accumulation to meet uncertain losses and for lessening the evil consequences of the accidental destruction of property, through the combination of the risks of many individuals in one group. Accumulation to meet uncertain losses and the transfer of risk are both involved, and in addition the combination of many risks in one group. It is this definition of the term that covers the business of insurance as it is carried on in the economic world.

The Relation of the Individual to Uncertainty. If we turn now from the social aspects of insurance to consider it from the point of view of the insured person, we find that for him its chief characteristic is the substitution of certainty for uncertainty, of a certain and definite expense for the possibility of an uncertain loss. Every person engaged in any form of industrial activity is exposed to many chances of accidental loss. Some forms of danger may be practically eliminated through the adoption of measures calculated to reduce the possibility of loss. Such measures may be grouped under the name "prevention." It is to be noticed that the fact that it is possible to avoid the danger of loss in a particular case by the adoption of preventive measures does not prove that it is desirable to do so. Such measures may cost more than they save. Preventive measures, therefore, will be adopted only so far as they are found to be economically advantageous.

A person engaging in industrial activity finds himself exposed to the possibility of accidental losses from various sources and of various degrees of uncertainty. To protect himself he may adopt any one of three methods. So far as it is economically advantageous, a prudent man will adopt preventive measures which will reduce the danger of loss and so lessen the degree of uncertainty. Against some of the remaining risks he may, from necessity or by choice, protect himself by making accumulations to replace the capital accidentally destroyed. He may then be said to be insuring himself, although the term "self-insurance" is more commonly restricted to such conduct with regard to risks against which it is possible to purchase protection from the insurance company. Where the transfer of risks to a company is impossible, as in the case of the danger of a shrinkage in the value of a stock of goods through a change in human wants, the method of self-insurance is the only one that can be adopted. Finally, with respect to a limited number of risks, protection may be secured by transferring them to insurance companies and substituting the obligation to make fixed and definite payments to the company for the necessity of making individual accumulations. The choice between these three methods of preparing to meet uncertain accidental losses will be made by a prudent person on the basis of their relative cost. Where insurance in an established company is possible, the choice of self-insurance would never be justifiable if the cost of insurance in the company were as low as it could be made with entire safety. It is only because insurance companies fail to reduce premiums to the cost level that many large business concerns find it advantageous to carry their own risks. A large concern with many detached risks can do it where a small concern cannot, but under ideal conditions it would not be a profitable proceeding even for the former.

COMMERCIAL INSURANCE

Commercial insurance comes under the last of the three definitions given at the head of this article. It is an economic institution for dealing with uncertain losses. The study of it may be conveniently made under three heads: the relation between the insured and the company, including an examination of the nature of the insurance contract; the kinds of insurance companies and their characteristics, including their methods of operation; the relation of the government to insurance, including a discussion of what it ought to be, as well as what it is.

The Relation between the Insured and the Insurance Company. *The Risk.*—An insurance contract transfers a liability to uncertain loss of a more or less narrowly defined nature from the person insured to the insurance company. For the insured it is the substitution of a definite payment or series of payments for the possibility of an uncertain loss; for the company, conversely, it is the acceptance of an uncertain liability in exchange for a definite payment or series of payments. It may be noted in passing that in the case of the mutual insurance company there is in theory the transfer of only a part of the uncertainty. The insured, being also insurer, is still exposed to some uncertainty as to the amount of loss he will suffer in the form of assessments. In practice, however, the difference between insurance in a mutual company and in a stock company is very slight, and during the present discussion may be disregarded. (Further reference to this matter will be made in considering the different kinds of insurance companies.) The insurance company assumes the legal obligation of paying to the insured certain specified sums on the occurrence of certain specified events. It assumes these liabilities, however, with the certainty that in the great majority of cases it will not be called upon to make the payments. Its actual liability is much less than its full legal liability. The actual liability which the company assumes in granting insurance at any time is technically known as "the risk." The most important question in this connection is how the risk is determined. In seeking an answer to this question two things have to be taken into account—the amount which the company binds itself to pay and the probability that it will have to make payment. These two factors will be considered in turn.

The maximum amount for which the company renders itself contingently liable is usually expressed in the policy. This amount ought in all cases to be limited to the insurable interest of the insured, i.e., to the amount of loss he would actually suffer from the occurrence of the event against whose consequences he is insured. To promise a larger amount is to make it for the interest of the insured to bring about the occurrence of the event—a condition of things which is prejudicial to the welfare of the company and contrary to public policy. In the insurance of property the attempt is nearly always made to apply this principle. In life insurance, however, and in other forms of insurance against loss of income from labor, no such attempt is made in many cases. A life insurance company does not undertake to limit the amount of insurance which any man may take out on his own life to the capitalized value of his income-earning capacity, any more than it limits his choice of beneficiaries to those who are actually economically benefited by his living. It cannot be denied that the results of this policy are in some respects very unfortunate. It leads to an increase in the incentive to commit two kinds of crimes—suicide and murder—and to a certain increase in the number of such crimes actually committed. That the situation is not intolerable is due to the fact that other motives are at work which are sufficiently strong in most cases to overcome entirely the economic motive.

Insurable interest, then, fixes the maximum amount for which a policy should be made out. Insurable interest may be defined as any legal or equitable right or interest such that the contingency insured against will result in financial loss to the insured. This definition, while not complete, covers the greater number of examples of insurable interest. Thus a mortgagee or pledgee has an insurable interest in the property mortgaged or pledged. A vendee of property under an executory contract of purchase has an insurable interest in the property. A common carrier or other bailee has an insurable interest in the goods bailed. The carrier also has an insurable interest in the prospective freight upon goods actually laden upon his ship or other vehicle for carriage. It will thus be seen that several different persons may have distinct insurable interests in the same property, and that these insurable interests may in the aggregate exceed the value of the property insured.

In general, no particular amount of insurable interest is necessary to make the insurance contract valid. It is enough if, at the time of effecting the insurance policy, the insured has some interest in the life or property insured. There is, however, one exception in the case of life insurance. Although in the case of insurance of the life of a relative the law does not require any limit to be placed on the value of the life insured, when the interest of the insured is purely financial, the insurance by a creditor of the life of a debtor, the amount of the insurance must bear some relation to the amount of the debt plus interest and the cost of insurance or it will be deemed void as a gambling contract.

One of the most important principles of the law of insurance is that the contract of insurance is a contract of indemnity only. It follows that in most forms of insurances the insurer must not only have an insurable interest at the time he effects the insurance, but that he must have an insurable interest at the time of the loss in order to recover on the policy, and the amount of the recovery will be measured by the amount of his insurable interest. The life insurance contract constitutes an exception to the rule. It is not strictly a contract of indemnity, but a contract to pay a fixed amount of money; and if the insured has an insurable interest at the time of effecting the insurance, so that the policy is then valid, he may recover the entire amount of the policy upon the happening of the loss, even though the insurable interest has then ceased. Insurance policies, known as "valued policies," are sometimes written in which an agreed value is assigned to the interest of the insured. In the event of loss the insured must still have his interest in the property insured, but the value of his interest is determined by the policy. In several States insurers against loss by fire are required by statute to issue only valued policies.

When there are several insurers of the same interest in the same property, their position in the event of loss is not unlike that of cosureties. If the amount of the several policies exceeds the value of the interest, the insured may not recover the full amount of property from the insurer, but each is required to contribute ratably to the loss; or, if the insured elects to recover the amount of the loss from any one insurer (as he may do in the absence of stipulation to the contrary in the policy), that one, on payment of the loss, may compel contribution pro rata by each of the other insurers.

In the case of marine insurance policies the insured is deemed to be a coinsurer with his insurer if the amount of insurance is less than the full value of the interest insured. The marine policy is therefore a policy of indemnity only if the property or interest insured is insured for its full value. If insured for less than its full value, the insured can recover on his policy only such proportion of the amount insured as the loss bears to the value of the whole interest of the insurance on the property.

The amount stated on the face of the policy is the maximum amount for which an insurance company may become liable. In some forms of insurance, as in life, accident, and sickness insurance, the amount stated in the policy is the amount actually paid if the specified event occurs, regardless of whether an equivalent loss is actually suffered or not. With most forms of insurance of property the situation is different. Whatever may be the face of the policy, the indemnity is not expected to exceed the loss actually experienced. If insured property is partially destroyed and the loss does not exceed the amount of the insurance, the amount of loss fixes the maximum amount to be paid as indemnity. In some countries in fire insurance any person who insures his property for less than its full value is held to be his own insurer for the difference between the value of the property and the amount of the insurance; and if the property is partially destroyed and the loss does not exceed the insurance, the indemnity actually paid is such part of the loss as the total amount of insurance in force is of the total value of the property. If, e.g., property insured for three-fourths of its value is partially destroyed, the indemnity actually paid will be three-fourths of the loss. The rest of the loss will fall upon the insured as coinsurer. In the United States this principle is not commonly applied except in marine insurance. In general, when insured property is partially destroyed and the loss does not exceed the amount of the insurance, the insurance company becomes responsible for the entire amount of the loss.

When the loss fixes the maximum amount of indemnity, it is clear that the amount stated in the face of the policy cannot be taken as the measure of the real liability which a company assumes in insuring a piece of property. It is true that there is an abstract possibility that every time a loss occurs it will be large enough to call for the full amount of the insurance, but there is a practical certainty that in many cases loss and indemnity will be less than the face of the policy. It is necessary, therefore, to calculate what is the probable ratio of the indemnity to the amount of insurance, or, in other words, to estimate the probable intensity of the loss. This can be ascertained, not by a study of the characteristics of the insured property, but only by the statistical analysis of the results of past experience. If it were shown by such analysis that for any particular kind of property the indemnity in a large number of cases had been on the average one-half the amount stated in the face of the policy, then the amount the insurance company would actually have at stake in a policy issued on property of that kind would be one-half the amount stated in the face of the policy.

Degree of Probability.—The determination of the probability of the occurrence of the event against whose economic consequences insurance is granted is a much more complex matter than the determination of the amount which the insurance company has at stake on a given policy. It is evident that this probability will vary with the length of time for which the insurance is to be in force; that, other things being equal, the probability of the occurrence of a chance event is twice as great for two years as for one year. It will be convenient to approach the problem by leaving out of consideration the element of time and assuming that all insurance is granted for a uniform period, say for one year. We may then consider what changes, if any, the introduction of the time element will involve.

It is to be noted in the first place that it is impossible to determine the degree of probability by the most exhaustive study of the individual risk. It is easy to see that there is more danger in one case than another—that, e.g., other things being equal, a wooden house is more likely to be burned than a stone house; but what the absolute probability is in either case does not appear. Whether either will be destroyed or not is a matter of chance, though with different degrees of probability. By this it is not meant that the destruction is uncaused, but that the forces at work are so complex that human knowledge is incapable of analyzing them completely.

As it is impossible to determine the degree of probability directly, the attempt is made to discover it in an indirect way. The method is the application of the theory of probability to the statistical results of past experience. The average of the past is the probability of the future. If the records show that for a series of years an event has occurred 10 times a year for every 10,000 opportunities for its occurrence, the degree of probability that it will occur in a future year, conditions remaining unchanged, is denoted by the fraction 10/10,000, or 1/1000. The actual number of occurrences in any one year may vary more or less from the probable number as indicated by the average. The probable degree of this variation may be determined from the character of the past series. The greater the fluctuations in the series in the past, the greater the variations of actual from average that may be expected in the future. But whatever the character of the past series, it will always be true that increasing the number of opportunities, provided they are all alike, diminishes the probable variation of the actual number of occurrences in any future year from the probable number as determined by past experiences. To state the same principle in a form more directly applicable to insurance, the greater the number of similar risks included in a group, the smaller the percentage of variation between the average number of losses for a series of years and the actual number of losses for any particular year.

The influence of time on probability under these ideally simplified conditions, i.e., on the hypothesis that all circumstances affecting the degree of danger remain unchanged, is very simple. The probability varies directly in proportion to the time. For n years the probability is n times as great as for one year. If, then, we represent by a the amount which an insurance company has at stake on a given policy, by p the probability of the occurrence of a loss within one year, and by n the number of years for which the company issues its policy, we should have the annual risk assumed by the company represented by the formula $a \times p$, and the total risk for the n years represented by $a \times p \times n$.

The real difficulties involved in the attempt to estimate risk have not yet been touched upon. They are practical rather than theoretical. The determination of future events by the application of the theory of probabilities to the results of past experience proceeds on the basis of two assumptions—that all the cases included, whether past or future, are alike in all essential respects and that the lapse of time brings no change in the factors affecting the degree of probability. Neither of these assumptions corresponds to the fact. As to the first we see that hardly any two lives or pieces of property are alike in all essential respects. In the case of fire insurance, e.g., the number of circumstances affecting the probability of destruction is very great. It is only by overlooking many minor points and assuming a degree of similarity that does not actually exist that the application of the statistical method is at all possible. The same considerations apply more or less to all other forms of insurance. The common practice is to group risks in classes, according to their more prominent elements, and collect data about the different classes from which to calculate the average. Each class has its own average and its own degree of probability. In estimating an individual risk the average of the class to which it belongs is used as a basis from which the particular risk is calculated by making allowance for any special conditions affecting it. The result is at the best a more or less close approximation to reality.

It is interesting to consider what the effect of the imperfect classification of risks is, both on the insuring companies and on the insured. To the companies it would make no difference of any kind if all adopted the same classification and applied it in the same way. A general underestimating of risks would, of course, lead to ruin. But an imperfect classification, as a result of which there were as many risks overestimated as there were underestimated, would do them no harm. An average of all kinds of risks would be perfectly safe for them, provided all kinds of risks were charged for according to the average. Thus, if there are 10 risks which, when properly estimated, amount to 1, 2, 3, and so on up to 10, the risk assumed by a company which insured them all would amount to 55; but the company is equally safe whether it charges each risk according to its proper value, 1, 2, 3, and so on up to 10, or charges each of them according to the average risk, which is 5½. Where there are competing companies, however, and one estimates risks more closely than the others, the result of imperfect classification is an unfavorable selection of risks. If one company assumed all risks from 1 to 10 at their proper valuation, while another assumed them all at the average valuation of 5½, the former company would get all the small risks, those from 1 to 5, and the latter the large ones, those from 6 to 10. We see, then, that where all insurance companies use the same classification, they have no incentive to perfect their system, but where one company introduces a more accurate classification, others are constrained to do the same or suffer from adverse selection.

The effect of imperfect classification of risks upon the insured is to cause a disproportionate distribution of the burden of insurance. In an ideal system this burden would be so distributed that each person would pay to the company in proportion to the risk he brought upon it. This ideal can never be reached, but the more nearly exact the calculation of risks, the more closely is the ideal approximated. The extent to which the attempt is made to estimate the risks accurately varies in the different forms of insurance. It is probably carried furthest in fire insurance, while in life insurance and other similar kinds comparatively little attention is paid to it. Most life insurance companies recognize only two classes of risks—those which come up to a certain standard and those which fall below it. The latter are rejected, while the former are all accepted at equal rates for equal ages. Yet in many cases the examining physicians would have no hesitation in declaring that some of those accepted would in all probability live longer than others. The result of this imperfect classification of risks is like that already noted—that in the long run the stronger and healthier lives pay a part of the cost of insurance of those possessing less viability. This injustice is partially eliminated through the return to the insured of a part of their premiums in the form of dividends, of which the longer lives receive the larger share. But that can mean no more than that the premium rates are scaled so high that the excess paid by the stronger lives is sufficient to make up the deficiency on the weaker and leave a remnant to be returned as dividends.

The fact that most insurance companies refuse to insure lives that do not come up to a certain standard suggests the question, What is an insurable risk? The answer clearly is that any risk—i.e., any chance of loss depending on the occurrence of any uncertain event—is insurable, provided there are sufficient data to enable the degree of probability to be estimated, and provided it is of such a nature that the insured cannot too easily make use of the insurance for his own economic advantage. However hazardous the risk, it may be covered by putting the premium high enough. It is sometimes stated that only those risks are insurable which threaten a large number of individuals at the same time. The larger the number of risks, the more closely the degree of probability can be estimated; but it is possible to make some estimate of it on the basis of a very small number of risks and cover the high degree of uncertainty by a high premium rate. No more is it true that the danger must be of such a nature that the loss cannot actually befall a large proportion of the insured at the same time. Here again it is a question of putting the premium rates high enough and accumulating large reserves. If every one of the insured lost at the same time, the company could meet the loss provided it had estimated the risks correctly. Nor, finally, does it make any difference how great the danger of loss may be. It is simply a matter of adjusting premiums to risks. A life insurance company insuring only the lives of consumptives might be on just as sound a financial basis as one which made a specialty of insuring only extra-healthy lives.

But while the theory of insurance is equally applicable to all forms of uncertain losses, its actual extension is limited by practical difficulties. The chief one of these is the impossibility of inducing people to pay the high rates which would make it safe for a company to assume very hazardous risks. Unless there is considerable difference between the uncertainty to which an individual is exposed and that to which an insurance company is exposed from the same risk, the gain from insurance becomes very slight when the cost of conducting the business is added to the first cost of the insurance. It is evident, however, that many risks are still untouched by insurance companies which offer a fair field for their activity.

One other point in connection with the subject of risks deserves brief consideration. While it is the purpose of insurance to reduce the burden which chance losses bring upon society, one of its consequences is an increase in the actual amount of loss. This is due to the effect of insurance upon the mind of the insured. An honest man may become less careful in protecting his property, a dishonest man may even seek to destroy his for the sake of obtaining the insurance. The danger of the loss through the carelessness or misconduct of the insured is commonly referred to as "the moral risk." It constitutes one element in every risk that the insurance company assumes, and one which in general it is very difficult to estimate. It is for the interest of the company to reduce the danger as much as possible, and it is contrary to public policy to allow them to increase it unnecessarily. Various forfeiture provisions are inserted in policies for the purpose of compelling greater carefulness and reducing misconduct. The chief reliance, however, must be on the strict application of the principle of insurable interest. It may even be practically advantageous to limit the amount of insurance to a certain percentage of the insurable interest in order to create a positive incentive to carefulness and honesty. Serious as the moral risk in insurance is, there can be little doubt that it is exaggerated in the popular opinion. Of all fires in Massachusetts for the period 1906–11, 2.4 per cent proved to be of incendiary origin, and less than one-third of these were set for the purpose of obtaining insurance. Doubtless some fires apparently of accidental origin were really incendiary. Nevertheless, it is a safe estimate that fires for the sake of defrauding the insurance companies represent only between one and two per cent of the total fire loss.

The Premium.—The amount paid to the insurance company by the insured is called the premium. It consists of two parts—the "natural premium" and the "loading." The amount of the natural premium is determined by the risk, or, to speak more precisely, it equals the risk. The loading is the amount added to the natural premium to cover the cost of insuring the risk. In other words, the natural premium pays the losses and the loading pays the expenses. The insured in any company must pay all the losses and all the expenses of the company, interest on the capital invested in the business included. This cost of administration is distributed among all the insured, each contributing a certain proportion of his natural premium.

It is interesting to consider what part of the entire premium is natural premium and what part is loading. In life insurance natural premiums are actually calculated and loadings added to them. In many forms of insurance, however, no such division is made in practice, but the whole premium is estimated together. In such cases the proportion of loading can be discovered only by an examination of the expense account, which will reveal what part of the receipts from premiums has been returned to the policyholders and what part has gone for expenses. It will be found that the proportion of loading varies a great deal from one kind of insurance to another and from one company to another. In some cases the loading does not exceed 20 per cent of the natural premium, in others it is as high as 100 per cent.

While from the social point of view the loading represents the cost of insurance, for a person seeking insurance the entire premium constitutes its price. He is consequently interested in the question whether the competition of insurance companies may be relied on to reduce the price to the lowest point consistent with absolute safety. It is evident that the competitive principle would operate in this field at a tremendous cost. Competition works through the elimination of the least efficient. The failure of an insurance company, however, may entail a far greater loss on the insured than it does on the insurers. The severity of the process of elimination has been greatly mitigated by the action of legislatures, many of which have provided for the compulsory winding up of the affairs of a company on the appearance of certain indications of danger, while the company is still able to take care of the insured by reinsuring its risks. Furthermore, the very uncertainty which constitutes an essential element of the insurance business makes unrestricted competition particularly dangerous. During a series of good years, when losses ran below the average, there would be an almost irresistible tendency to reduce the price of insurance to the level made possible by the prevailing favorable experience. If years of unusually high losses followed, as they naturally would follow, the company would find itself hard pressed to meet its obligations. Thus there is always the danger that competition would reduce the cost of insurance below the margin of safety.

Is competition the force that is actually regulating the rates of insurance? There is keen competition among the agents of different companies, but it does not manifest itself in a fall in rates. The agents have no authority to make reductions. There are occasional periods of actual competition between companies, but for the most part they retain schedules of rates founded on a basis reached by common agreement. The statute books of the different States contain many laws which were enacted for the purpose of preventing such agreements and securing competition, but they have accomplished little. The opportunities for secret agreements are too numerous. For the most part the companies do not seek to extend their business by lowering rates; they rely on the persistence of their agents and the attractive features of their policies.

The Insurance Contract.—The agreement between the insurer and insured constitutes the insurance contract. This contract is of a kind which in some respects resembles a wager, and a few writers have been misled into identifying the two forms. In both cases one party to the agreement binds himself to pay a certain sum on the occurrence of an uncertain event. The event may be the same in the two cases. Thus, a house may be insured by its owner and at the same time may be the subject of a wager between two disinterested persons, so that if the house burns, each of the two men receives the amount stated in the agreements. The illustration brings out the fundamental distinction between insurance and gambling. The one is the transfer of an existing risk from the person exposed to it to another party; the other is the voluntary creation of supposedly equal risks by two persons, neither of whom was before exposed to the risk. It is this principle that underlies the legal doctrine of insurable interest, in accordance with which the courts distinguish between insurance contracts and wagers. In the case of life insurance, as we have seen, this doctrine is very imperfectly followed.

The real subject matter of the insurance contract is security. The insured buys security by the payment of the premiums. The insurer performs his part of the contract just as much in the case of those of the insured who escape loss, and to whom consequently no indemnity is paid, as in the case of those who suffer loss and receive indemnity from the insurer.

The insurance contract is one of good faith. The insured is bound to reveal to the insurer all circumstances within his knowledge which have any bearing on the possibility of loss. The willful misrepresentation of any material fact, i.e., of any fact affecting the probability of loss, usually works the forfeiture of the insurance.

The insurance contract is a personal one; it is between the company and the person taking out the insurance. A transfer of the insured property does not transfer the insurance, but renders it void, since the insured no longer has the insurable interest. In practice, however, insurance companies frequently allow the transfer of insurance to be effected by indorsement. This personal character of the contract makes it possible to control to some extent the moral risk. If the insurance went with the property insured, the company would have no protection against the passing of the insurance into the hands of a person whose reputation showed him to be an undesirable risk.

The Policy.—The writing in which the insurance contract is set forth is called the policy. This consists of two parts—the application of the person desiring insurance and the agreement of the company to give it. The application is expressly stated to be a part of the contract. In it the applicant sets forth all the material facts about the risks which he desires insured. Some of the statements are representations, others are warranties. In many policies there is an express provision that every statement of the insured in his application shall be regarded as a warranty. A misstatement in a warranty, whether it is material or not, works forfeiture of the policy. A misstatement in a representation does so only when it concerns a material fact. A misstatement is material whenever it induces a company to enter into a contract which it would not have accepted if the truth had been known. Common forms of representations or express warranties are the statement that there is no other insurance upon the property, statements as to the location of the property, or as to the character of the business carried on in or upon the property, and, in the case of life insurance, statements as to business or condition of health of the insured. In contracts of insurance other than marine insurance, warranties must appear directly or by reference upon the face of the policy; but in marine policies there are three important warranties implied by law, irrespective of the terms of the policy. See MARINE INSURANCE.

Waiver or Estoppel.—Growing out of the doctrine of representation and warranties is the important doctrine of waiver, or estoppel as it is somewhat incorrectly called. As the effect of misrepresentation or breach of warranty is to give the insurer the right to avoid the policy, the right itself may be waived either expressly or by the contract of the insurer. Thus the receipt and acceptance of a premium by the insurer with knowledge by him of a breach of warranty waives the breach and renders the contract valid.

Upon similar grounds, if the insured gives imperfect or ambiguous answers to the questions asked by the insurer at the time of effecting the policy, the insurer is declared to have waived fuller or more specified answers and cannot avail himself of a defective answer as a ground for avoiding the contract. The question of waiver, or estoppel, has frequently arisen in cases where the written application for the insurance policy, which is made a part of the policy, is filled in by the agent of the insurer, although signed by the applicant. If the agent does not correctly transcribe the answers of the applicant for insurance, it is open to the insurer, in event of loss, to rely upon the untruth of the written answers as a breach of warranty avoiding the policy. In many States the courts have held that the insurance agent, although in fact doing an act expected of and attributed to the insured, remains the agent of the insurer, and that the insurer, through his agent having notice by the answers of the insured of the matter relied upon by the insurer as a breach of warranty, and having after such constructive notice issued the policy with full knowledge of the alleged breach of the written terms, is estopped from relying on the breach as a defense to his liability on the contract of insurance. While the doctrine undoubtedly works out substantial justice, it has been subject to severe criticism on the ground that it is not a true estoppel (see ESTOPPEL) and that it violates the parole evidence rule (see EVIDENCE) in permitting the insured to contradict the written answer contained in his application.

Life insurance policies are freely assignable, and if issued in good faith to one having an insurable interest, the assignee need not have an insurable interest in the life insured. Policies of marine insurance are also freely assignable; but as the marine policy is purely one of indemnity, it is necessary that the assignee should acquire the interest insured in order to recover on the policy. Fire insurance policies, owing to the importance of the personality of the insured, can be assigned only with the consent of the insurer.

The policy contains precise statements as to the conditions under which the insurance will be forfeited, the conditions under which the indemnity becomes payable, and the procedure by which the insured is to prove loss and obtain the indemnity. Sound policy would seem to require that all these conditions should be of such a nature that they would put no unnecessary obstacles in the way of honest insurance, and set forth so clearly that the insured could have no excuse for misunderstanding the exact nature of the contract he has entered into. The better class of insurance companies have undoubtedly aimed to give the insured fair treatment. In too many cases, however, companies have shown a disposition to take advantage of obscurities or technicalities in the contract to avoid paying honest losses. So prevalent has this practice been that the legislatures of many of the States have considered it necessary to come to the protection of the policyholders. For example, the practice of printing some essential feature of the policy in very small type so that it easily escaped the notice of the insured has been met by legislation prescribing the smallest size of type that may be used; the requirement of formalities in proving claims which in many cases the insured are unable to fulfill has been declared illegal and not binding.

In interpreting all the claims of the insurance policy it is a general rule that, inasmuch as the insurer in fact proposes the policy and fixes the terms, the terms of the policy will be construed most strongly against the insurer. Thus, a policy which stipulates that the building insured is "detached 50 feet," in the absence of express language to the contrary will be deemed to mean detached 50 feet from any building affecting the risk, and not from any building irrespective of the character.

Kinds of Insurance Companies and their Characteristics. *Public and Private Insurance.*—Insurance companies may be classified in various ways according to the characteristics on which the classification is based. Thus, with respect to the nature of the insuring body, public insurance may be distinguished from private insurance. Public insurance is insurance issued by a body politic, whether nation, State, or a minor civil division; private insurance is insurance issued by a private person or by a group of private persons. Public insurance will be discussed in the concluding part of this article.

Mutual and Joint-Stock Insurance.—Private insurance may be further subdivided into mutual insurance and insurance for gain, sometimes called commercial insurance. In its simplest form a mutual insurance company is based on an agreement entered into by each member to pay a share of the loss sustained by any other member from certain specified causes. The proportion to be paid by each member is based on the risks to which he himself subjects the company. Mutual insurance is seldom found except in the case of risks which are nearly uniform in character, so that the degree of risk varies almost invariably with the amount of insurance. Thus we find one class of mutual fire insurance companies insuring cotton mills, another insuring packing houses, a third insuring farm buildings, and a fourth confined to city dwellings. It is the comparative uniformity of the risks involved which has been partly responsible for the general application of the mutual principle to life insurance.

When the funds to reimburse losses are collected by assessment after the occurrence of the loss, the annual contribution of each member, i.e., the cost of his insurance, is more or less uncertain. As has already been pointed out, insurance in a mutual company collecting its funds in that way is the substitution of a smaller degree of uncertainty for a greater degree, of the prospect of making small annual payments varying within a comparatively slight range for a much smaller probability of a far greater loss. The more regular the loss from year to year, the less are the fluctuations in the assessments, and therefore the more advantageous the insurance on the mutual plan. The relatively great regularity of loss from year to year has made possible the application of the assessment principle to life insurance to a far greater extent than to other kinds.

Very few mutual insurance companies are now run on the pure assessment principle. In nearly all companies there is some accumulation of reserves which may be used to equalize the premiums in spite of considerable fluctuations in the amount of loss. Some of the older companies, especially in fire insurance, have thus accumulated very large reserves, which enable them to return to the insured in the form of dividends a part of the premiums collected.

It is in life insurance that the mutual principle is applied most extensively. The practical difference between the old-line mutual companies and the joint-stock companies is very slight. The capital stock of a stock company is of importance only so long as it constitutes a considerable part of the fund which serves to guarantee sufficient security for the protection of the policyholders.

From the point of view of the policyholder, a more important difference consists in the fact that the stockholders in a joint-stock company have a control over the investments of the company which may be exercised with little regard to the interests of the insured. (See LIFE INSURANCE.) The stockholders may, however, give a certain representation on the board of trustees to the policyholders. Thus, in 1906, the charter of the Equitable was so amended as to give the policyholders the right of electing a majority of the board of trustees.

Mutual companies are most numerous in fire insurance. These are small companies, usually confining their operations to a limited area and to some one or two classes of risks. The reason for their existence is usually to be found in the belief, whether justifiable or not, that the stock companies are not managed as economically as they ought to be, thus enabling the mutual companies to make a saving in the cost of management; and that the particular kind of property in question is improperly classified and the premium rate in consequence unjustifiably high.

Individual Underwriting.—Insurance for gain is most commonly issued by joint-stock companies, but sometimes by individuals. There is no reason why insurance issued by a single person might not be as secure as that issued by a joint-stock company, provided the insurer sets aside a sufficient guarantee fund. As a matter of fact, however, comparatively little insurance is written by individuals. Some of the States have gone so far as to prohibit the practice entirely, influenced largely by the constitutional and other difficulties in the way of exercising adequate supervision. In marine insurance, however, individual underwriting is still common. In the English Lloyds it is the prevalent form of insurance. Within recent years attempts have been made to establish an ostensibly similar form of underwriting in the fire insurance business in the United States. The promoters of the American Lloyds have claimed exemption from the jurisdiction of the insurance departments on the ground that they were not insurance companies within the meaning of the law. They still enjoy this exemption in a few States, but there is a general tendency to bring them under the same regulations as apply to joint-stock companies. Few of the Lloyds survive after their freedom of action is thus restricted. It is to be noticed, however, that the failure of so many of them is due, not to the practice of individual underwriting in itself, but to the fact that the ostensible reserve for the protection of the policyholders has usually been of little real value.

The most obvious classification of insurance companies is on the basis of the kinds of risks which they assume. Thus, we have fire insurance companies insuring against loss by fire, marine insurance companies against loss at sea, plate-glass insurance companies against the breaking of plate-glass windows, and so on. Some companies confine their business to one kind of risk, while others assume two or more kinds. This division of the field of insurance among different companies is purely a matter of practical convenience of administration. There is no a priori reason why one company should not issue insurance against all kinds of insurable risks; in fact, the theoretical arguments are all on the side of such action. So long as each risk is correctly estimated according to the principles already pointed out, the more risks the company assumes the more cheaply it can afford to grant insurance, since the element of uncertainty in the amount of loss to be expected constantly diminishes as the number of risks increases. The combination of fire and marine insurance on the one hand, and of life and accident insurance on the other, is by no means unusual, and outside of these forms the tendency seems to be for companies to extend the field of their activity. Thus the Fidelity and Casualty Company of New York has a charter authorizing insurance of "any contingent event whatever, life, fire, and marine risks excepted, which may be the subject of legitimate insurance." The company actually carries on the following kinds of insurance: accident, burglary, employers' liability, fidelity and surety, plate-glass, and steam-boiler.

By far the largest part of the insurance in force is for protection against loss through the destruction of property by the action of natural forces. This is the case, e.g., in fire, marine, plate-glass, tornado, steam-boiler, and elevator insurance, and in most forms of so-called agricultural insurance, such as insurance of live stock and growing crops. The chief differences between these various forms are connected with the technique of the business rather than with its general principles. Thus, the body of data from which to calculate average losses is much smaller in some kinds than in others; the difficulty of determining the amount of loss varies greatly from one kind to another; and the moral risk involved in the various kinds is very unequal.

The class of insurance which ranks next in importance is made up of those forms which undertake to give indemnity for the loss of income through the sickness, injury, or death of the person insured or his inability to obtain employment. Life insurance is treated in a separate article under that title. Other forms of insurance in this class deserve brief notice on account of their great social significance.

Sickness and Accident Insurance.—Sickness insurance and accident insurance are carried on under various forms. There are a number of joint-stock insurance companies in the United States and in foreign countries which issue accident insurance policies, and a considerable number which guarantee weekly indemnity in case of sickness from certain specified diseases. Many fraternal associations and trade-unions assure their members indemnity for loss of income through accident or sickness. Several large business corporations have established funds for the insurance of their own laborers against accident or sickness or both, in some of which membership is voluntary, in others compulsory. Finally, several European countries, following the lead of Germany, have introduced a system of governmental insurance of workingmen against certain contingencies, sickness and accident included. Private accident insurance was first introduced into the United States in 1863, though one or two railways had previously attempted to sell tickets insuring travelers over their own lines. The development of the business was very rapid. It was taken up by many insurance companies and for a time by several railroads. Short-time insurance of travelers still constitutes a very considerable part of the business of accident companies, though general policies, usually covering a year, are now common. In many companies these policies are limited to accidents which result in death or total disability. Some companies, however, issue policies which cover also certain specified injuries of a permanent nature, such as the loss of an eye, a hand, or a foot. The indemnity varies with the nature of the injury and the amount of the premium.

Commercial sickness insurance is as yet offered by a small number of regular insurance companies in the United States. The policies generally guarantee a weekly indemnity during illness or for a limited period, in case of certain specified diseases. Sometimes the company undertakes to pay a stated lump sum for a permanent disability such as total blindness or paralysis.

The moral risk constitutes a very large element in both accident and sickness insurance, especially in the case of laborers with small incomes. Merely limiting the indemnity to an amount less than the wage of the laborer does not remove all incentive to simulate or even bring about the disability which entitles the insured to indemnity. He is comparing not merely daily indemnity with daily wage, but indemnity and idleness with wage and 8, 10, or 12 hours of work. Experience has shown that the moral risk can be much better controlled where the insurance is granted by a body like a trade-union or a lodge. Here the knowledge the members have of one another's affairs affords a more efficient check upon malingering than any which a regularly established insurance company is able to use. Hence it is not surprising to find that by far the largest part of the insurance of workers against sickness and accident, in those countries where the government has not taken up the business, is in the hands of these organizations of the laborers themselves. For the development of governmental sickness and accident insurance, see WORKINGMEN'S INSURANCE.

Employers' Liability Insurance.—Closely allied to accident insurance is the insurance of employers against claims for damages arising from accidents to their laborers, so-called employers' liability insurance. This form of insurance, like the preceding, originated in England. It was introduced into the United States in 1886 by a London insurance company. There are now a number of companies engaged in the business in America. They no longer confine their operations to the employer's liability for accident to his employees, but cover also liabilities for accidents to persons not in the employ of the insured. Railroad corporations, construction companies, manufacturing concerns, protect themselves in this way. The risk varies greatly in different occupations and there is a corresponding variety of premium rates. The schedule of classifications adopted by the companies embraces nearly 1000 different kinds of risks. The development of the business in recent years has been greatly accelerated through the general extension by statute of the liability of the employer for indemnity for accident which he was not obliged to indemnify under the common law.

Unemployment Insurance.—Insurance of workers against loss of income on account of lack of employment presents greater difficulties than those involved in accident insurance. The moral risk here becomes very great. Such insurance has never been carried on successfully by commercial insurance companies. Many of the trade-unions pay out-of-work benefits to their members, but the business is not run on scientific insurance principles. In none of the benefits paid by the trade-unions is there any attempt to correlate the risk and the assessment, nor is there any separation of the insurance fund from the other funds of the union. Unemployment insurance has been tried by some of the Swiss communes, but with poor success. It is an unfortunate fact that insecurity of employment, which constitutes such a serious evil in the life of laborers, is a form of uncertainty with which it is extremely difficult for insurance to deal. See WORKINGMEN'S INSURANCE.

Fidelity and Surety Insurance.—Of the remaining forms of commercial insurance two are of special interest—fidelity and surety insurance and credit insurance. Fidelity insurance, according to the distinction made by the New York State Insurance Department, consists in giving bonds for the honesty of employees and public officials, while surety insurance consists in going on the bonds of administrators and executors of estates. This kind of insurance is interesting as illustrating the regularity in human conduct to which Quetelet first called attention. It is only because of the comparative regularity in the annual number of defalcations and similar crimes that the insurance company is able to assume the risk of such occurrences for a premium small enough to make the business practicable.

Credit Insurance.—Credit insurance undertakes to indemnify merchants and business men who give credit for losses through bad debts. This form of insurance was first introduced into the United States about 1890. The successful prosecution of this form of underwriting is extremely difficult, owing to the high degree of moral risk involved. To guard as far as possible against the abuse of the system by the insured, a very ingenious method was adopted. The insurance applied only to credits given to persons with a rating in the mercantile agencies, and the amount of credit to be given to them was usually limited to 20 per cent of their lowest capital rating. Moreover, the insurance did not apply to any particular credit, but was based on the average loss for a year. The person applying for insurance was required to furnish a statement of the amount of his credits and the amount of his losses from bad debts for a number of years, and the average annual ratio of losses to credits was ascertained. The insurance applied only in those years when the ratio of loss to credits exceeded the average, and covered only the excess of the loss above the average.

There are many other interesting applications of the insurance principle which must be passed over without notice. As indications of its possible development may be mentioned the following instances. The saloon keepers in a particular city form an association which undertakes to pay an indemnity to any member who is unable to secure a renewal of his license; the newspaper publishers of Finland enter into an agreement to indemnify one another for losses incurred through the suppression of particular issues of their papers by the order of the Russian government; finally, the manufacturers of Austria bind themselves to pay indemnities for losses occasioned by strikes instituted by workers in their factories.

Preventive Activity of Insurance Companies.—In comparing premiums and indemnities for the purpose of ascertaining the actual cost of the administration of the insurance business, it is necessary to bear in mind the fact that insurance companies carry on other forms of activity besides guaranteeing indemnity. One of the most prevalent of these forms is their preventive activity, under which name may be included all the efforts which the companies make to prevent the occurrence of the event against whose consequences they grant insurance. The relative amount of such activity varies greatly in the different kinds of insurance. There is very little of it in life insurance. In accident insurance we find the companies distributing books and pamphlets containing information as to the first aid to the injured. It is in the insurance of property, however, that such activity is most common. In the case of elevator and steam-boiler insurance a very considerable part of the expense of management is due to the systematic inspection of insured elevators and boilers which the companies carry on.

In the early days of insurance the distinction between insurance and prevention was not very sharply drawn. The early English fire insurance companies, e.g., laid special emphasis on the service which they rendered the community through the maintenance of fire brigades. A survival of this confusion of ideas can be seen in the legislation of many of the States compelling fire insurance companies to support wholly or in part the fire service of the cities. Whatever payments the companies make for such service are made out of the funds collected from the insured. The injustice of compelling a limited number of property owners, the insured, to support such an institution as the fire department, intended for the benefit and use of the whole community, seems too obvious to need argument.

While life insurance companies do little or nothing to prevent the occurrence of loss, only a small part of their activity can be strictly called insurance. A very large proportion of the premiums they receive are rather in the nature of investment. The relation between the two forms of activity is discussed in the article on LIFE INSURANCE.

Reinsurance.—The custom of reinsurance which prevails to a great extent among insurance companies may be briefly described. To avoid the possibility of being called upon to pay excessive indemnities at any time, insurance companies are accustomed to limit the amount of insurance that they will carry on any one risk. The maximum risk carried by one company may be $10,000, that of another company $50,000. If a company insures a piece of property for more than the maximum risk it carries, it protects itself by reinsuring the excess in another company. The practice of reinsurance is naturally seldom found among mutual companies, but it is very common among stock companies. Many of the latter have from 10 to 20 per cent of the risks they have assumed reinsured, while occasionally one is found with three-fourths of its risks so protected. Conversely, there are companies which devote themselves entirely to the practice of reinsurance, issuing no policies directly to property owners.

Relation of the Government to Insurance. The economic and social value of insurance can hardly be overestimated. The application of the insurance principles in the production of wealth reduces materially the cost of commodities and services; the proceeds of life insurance policies keep many families from want or charity; while the peace of mind which insurance creates is certainly of great value. It is therefore of great importance that the system should be widely extended and that as many people as possible should enjoy its advantages. It is pertinent to inquire whether the management of insurance by private companies is as efficient as it ought to be; whether there are any a priori reasons for expecting better results from governmental management; and what has been the experience of such governmental insurance offices as have been already established.

The first requisite of a satisfactory system of insurance is security. In this respect no criticism can be brought against the older companies in the established lines of insurance. It must be admitted, however, that while many companies have of their own initiative adopted such methods as are calculated to secure their stability, many others have been reckless or even dishonest in their management. The total amount of money collected in the form of insurance premiums by companies which have failed to make the agreed returns to the insured is very large. The general high level of security in the insurance business in the United States is due to no small extent to the stringent requirements of the insurance departments in the various States.

The second requisite of a satisfactory system of insurance is cheapness, premium rates as low as is consistent with safety. In this respect the results of private underwriting leave much to be desired. As already pointed out, unrestricted competition would be both an imperfect and an extremely costly method of regulating rates. As a matter of fact, in the United States, competition has comparatively little influence in fixing rates or compelling economies of management. In all lines of insurance the rates are fixed by agreements, and the attempts of the legislatures of various States to reinstate competition by legislative fiat accomplish practically nothing. It may be true that in many cases the rates are none too high to cover losses and expenses as insurance companies are at present managed, but in many cases losses and expenses are unnecessarily high. It is one of the advantages of unrestricted competition that it forces the adoption of economical methods. In the insurance business, however, such competition as survives does not result in cheaper methods and a lower cost of insurance, but rather in the expenditure of larger sums in the attempt to secure new business, and in the presentation of more attractive but more expensive methods of settling policies. Moreover, altogether aside from the question of cost within a single company, large numbers of companies, and the consequent multiplication of managers, agents, and material equipment, greatly increase the cost of insurance. There is no other line of economic activity in which the gain from production on a large scale is so great as in the insurance business.

With respect to security, governmental insurance clearly has the advantage. Nothing could be more secure than the insurance policy guaranteed by the government. With respect to cheapness the case is not so simple, though the advantage would probably be with the government office. The possible saving in the actual management of the business would be enormous, and the large scale on which governmental insurance could be carried on would greatly reduce its cost. It would be unnecessary for the government to accumulate large reserves when the number of the insured had become so great that the amount of loss was practically uniform from year to year. The only reason why there can be any uncertainty as to the comparative economy of governmental insurance and private insurance is that the government is generally a wasteful manager; but in this particular case the opportunities for economy are so numerous that it seems hardly doubtful that the net cost of insurance would be lower if the entire business were in the hands of the government. The difficulties in the way of governmental insurance are of a political nature, and that they are very serious cannot be questioned. The business would present unlimited opportunities for the manifestation of favoritism for the purpose of furthering personal and political ambition; so that while an ideally managed governmental insurance would be far preferable to the present system of private underwriting, the political evils which would result might be so great that they would overbalance the economic gain.

The experience of the governmental offices already established does not afford conclusive evidence either for or against public insurance. Public fire insurance offices have been maintained for many years by some of the Prussian towns and by some of the Swiss communes. All sorts of methods have been tried—governmental monopoly with compulsory insurance, governmental monopoly with voluntary insurance, compulsory insurance with choice of public or private office, and voluntary insurance with the same choice. The experience of the public offices is, on the whole, unfavorable to governmental insurance. The governments have generally found it necessary either to introduce a large amount of formality and supervision, thus rendering the business unpopular, or to adopt a loose classification of risks, which, in cases where the competition with private companies was allowed, resulted in the better risks going to the private companies with a more accurate classification and the poorer risks going to the government office. Finally, all these public offices are on so small a scale, generally limited to a single town or commune, that they have failed to realize the great advantage which comes from a large number of well-distributed risks, viz., the relatively slight fluctuation in loss from year to year.

The English government has for nearly 50 years offered life insurance to its citizens through the Post Office Department. It has made no attempt to develop the business, either through personal canvassing by its agents, after the manner of private companies, or through advertising. The amount of business written has been very small. This experience, however, is not conclusive as to the results of a similar experiment in the United States, where the habit of insurance is more thoroughly established than in any other country, except possibly New Zealand.

New Zealand furnishes the only example of a thoroughly successful governmental life insurance office. In this case, however, the success of the office has been largely due to the deliberate adoption of the methods of private companies, especially the solicitation of business through agents paid by commissions. This has prevented the office from realizing any great economies of management, and its rates do not differ much from those of private offices. New Zealand is said to have a greater per capita amount of life insurance than any other country, and a little over half the business is taken out through the public office.

The only feasible alternative to governmental management of the insurance business is governmental regulation of private companies. This is the method actually in use in nearly all civilized countries. The degree of regulation and supervision varies greatly from one country to another. There is as little of it in England as in any country, and as much of it in the United States as anywhere. In the latter country each State regulates the business within its own borders and imposes such restrictions on the activities of the companies as it sees fit. The most general provisions are the requirements of annual reports from the companies, exhibiting in detail the business for the preceding year, and the requirement of a reserve bearing a certain ratio to the amount of insurance in force. Some of the States have shown a disposition to impose vexatious conditions upon the companies, the only effect of which is to increase the cost of insurance within their borders. But however reasonable the laws of each State, considered by themselves, may be, the variation in the requirements of different States and the multiplication of reports and examinations impose a great deal of unnecessary expense on the companies, all of which in the end must come out of the policyholders. Insurance men and State officials alike join in the attempt to bring about greater uniformity among the requirements of the different States. It would be a great gain in this respect, as well as for other reasons, if the national government would take over the regulation and supervision of the insurance business. Unfortunately, the United States Supreme Court, in the case of Paul *v.* Virginia, has ruled that the business of insurance is not commerce; that consequently it is not interstate commerce when an insurance company incorporated in one State carries on business in another; and that, therefore, the regulation of the business is reserved to the individual States.

Bibliography. The English and American writings on insurance are nearly all of a technical or practical character. The only general work of any great merit in the English language is Walford's *Insurance Cyclopædia* (London, 1871–80). Of the numerous general works in French and German, the following are among the best: Chaufton, *Les assurances* (Paris, 1884); Emminghaus, "Versicherungswesen," "Feuerversicherung," "Lebensversicherung," in Conrad's *Handwörterbuch der Staatswissenschaften*, vols. vi, iii, and iv (Jena, 1890–94); Brämer, *Versicherungswesen* (Leipzig, 1894); Wagner, "Versicherungswesen," in Schönberg's *Handbuch der politischen Oekonomie*, vol. ii (Tübingen, 1896–98); Moldenhauer, *Versicherungswesen* (Leip-

zig, 1905). The work which, when it is completed, will undoubtedly be the most erudite and exhaustive in any language is the *Handwörterbuch des gesammten Versicherungswesen*, edited by Baumgartner, the first volume of which was published in 1897–98 (Strassburg). The annual *Cyclopedia of Insurance in the United States*, published by the Insurance Journal Company of Hartford, Conn., contains valuable digests of the insurance legislation of the various States and of judicial decisions affecting insurance, and also descriptions of the forms of policies issued by the different life insurance companies. Ehrenzweig's *Assekuranzjahrbuch* (Vienna, 1880) gives information about insurance in European countries. For statistics of the United States the best source of information is the *Reports* of the insurance departments of the various States. Among the more valuable of these reports are those of Massachusetts, New York, and Ohio. The *Spectator Year-Book* (New York, 1869 et seq.) gives full information about fire insurance in the United States. Consult also Martin, *History of Lloyds and of Marine Insurance in Great Britain* (London, 1876); Hugo Schramm-Macdonald, *Feuerversicherungswesen* (Dresden, 1883); Gow, *Marine Insurance* (London, 1895); Griffin, *Library of Congress List of Works Relating to Government Regulation of Insurance* (Washington, 1906); Richard, *Théorie mathématique des assurances* (Paris, 1908); Manes, *Einführung in die Versicherungspraxis* (Tübingen, 1908); Huebner, *Property Insurance* (New York, 1909); Gephart, *Principles of Insurance* (ib., 1911); id., *Insurance and the State* (ib., 1913). See Accident Insurance; Fire Insurance; Life Insurance; Marine Insurance.

INSURANCE OF TITLES. See Title Insurance.

INTAGLIO, ĭn-tăl′yo, *It. pron.* ên-tä′lyô (It., incising, cutting into). The opposite of cameo (q.v.). While the design of a cameo rises above the background, that of an intaglio sinks below it. (See Gems.) In other words, a cameo is a relief (see Relief Sculpture), an intaglio is a hollow. In making a wood engraving (q.v.) background is cut away, leaving the part that is to print in relief like the design of a cameo; in making a copperplate the surface is *cut into* with burin or acid, leaving the design hollowed out like that of an intaglio. (See Engraving.) In order that seals (see Seal) may be in relief, the matrixes of the signet rings or stamps from which the impressions are made on wax or lead or clay, or in ink on paper, are cut intaglio.

INTAR′SIA. See Tarsia.

IN′TEGRAL CAL′CULUS. See Calculus.

INTEG′UMENT (Lat. *integumentum*, covering, from integere, to cover, from *in*, in + *tegere*, Gk. *στέγειν*, *stegein*, to cover; connected with OHG. *dah*, Ger. *Dach*, Icel. *pak*, Eng. *thatch*). The external coating or skin of animals. The term "integument" is also sometimes used synonymously with cell membrane, a product of secretion which serves for the support or protection of the cell.

Lower Orders. The cell integument found in certain Infusoria consists of a chitinous or cellulose membrane, which may even harden into a shell by the impregnation of carbonate of lime. In *Difflugia* this membrane becomes a case by its union with small foreign particles. The integument or body epithelium (epidermis) of the Cnidaria consists of one layer of epithelial cells. These cells may be ciliated or flagellate, and in this layer occur the stinging cells or nematocysts (q.v.). These stinging cells may be grouped in masses, in which case they are known as stinging knobs or stinging batteries. Moreover, in the ectoderm sensory, nerve, muscle, gland, and pigment cells may arise. In the flatworms a body epithelium occurs among this type only in Turbellaria. It is ciliated, and in it are glands, the so-called rods or rhabdites. In trematodes and cestodes its place is taken by an elastic cuticular membrane, usually perforated by fine pores. In nematodes and *Sagitta* it is a single layer, in some species ciliated. The entire outer surface of mollusks is covered by a single layer of epithelium which may be ciliated in regions not protected by a shell. In this layer are many unicellular glands or the ducts of others that have sunk below the surface of the epithelium. The shell of mollusks is a calcified cuticle. Stinging cells may occur in the integument of gastropods, although the pigment usually occurs in the deeper cutis. The integument of cephalopods is a cylindrical epithelium, and is made up of deep-lying connective tissue which contains contracting and expanding pigment cells, the chromatophores. The integument of echinoderms consists of a unicellular epithelium, and beneath it a layer of connective tissue of mesenchymatous origin. In the latter the skeletal structures develop. In some forms (Crinoidea, Ophiuroidea), particularly in adult stages, there is no sharp line of distinction between epithelium and cutis. The epithelium is covered by a cuticle, and in Asteroidea and Echinoidea it is ciliated over the whole surface; in other forms usually the food groove alone is ciliated. Unicellular glands and pigment cells also occur in the epithelium; while sensory cells, nerve ganglia, and fibres differentiate out of it. The integument of annelids consists of the hypodermis or body epithelium and an outer cuticle. The latter may be thin, with pores for cilia to pass through, or it may be a thick protective covering and offer support for the attachment of muscles. It may be chitinous or even calcified into a hard shell, and is either produced by gland cells in the hypodermis or else it is a product of the metabolism of these cells. The hypodermis may be so much reduced as to be little more than a strong cuticle, as in the case of the Polyzoa, where it is hardly recognizable. A basal membrane sometimes underlies the hypodermis.

Arthropods. The chitinous secretion of the hypodermis is still more strongly developed in arthropods than in worms. It covers the whole surface of the body and appendages, and is known as the exoskeleton, and to it the muscles are attached. As its presence is a barrier to the increase in size of the animal, it is thrown off from time to time, and its place is taken by a soft, flexible coating which has developed underneath it. The new coating soon hardens when exposed on the surface. See Molting.

Vertebrates. The integument or skin of vertebrates is an organ of much extension, but of little thickness. Physiologically it is one organ because its parts are closely united together and act together, and in most vertebrates they are easily separable from underlying tissues. The integument functions as an organ of support and protection to internal tissues and as an organ of secretion and excretion. Morphologically it is made up of organs of widely dissimilar origin and histological character. It is divisible, however, into two layers. The outermost of the two is derived wholly from the ectoderm and consists of an epithelium of cuboidal or flattened cells. The inner layer is derived from mesenchyme and consists chiefly of fibrous connective tissue in which there is a large amount of secreted substance. The outermost layer is called the epidermis, the innermost the derma (or dermis), also corium or cutis. Each of these parts contains other organs.

Three types of epidermis may be distinguished: (1) that of *Amphioxus;* (2) that of fishes; and (3) that of the Amniota. The Amphibia occupy a middle ground between the second and third, in that their epidermis is at first fishlike and later similar to that of the Amniota. In the first type the epidermis consists of a single layer of cuboidal cells—the condition of the epidermis in all invertebrates. This type may be called unistratous. The second and third types differ from the first and agree with each other in that they possess more than one layer of cells; hence they may be called multistratous. The epidermis of fishes consists of many layers of columnar or cuboid cells, the more columnar ones lying at the base. There is a cuticle over the free surface provided with fine pore canals. From the essential similarity of the epidermal cells throughout, the epidermis cannot be divided. This type may therefore be called homostratous. The epidermis of animals that live in the air (Amniota) has become modified to withstand desiccation. There may now be distinguished in man, e.g., two regions in the epidermis—a deep one composed of active cuboidal cells and a more superficial one of flattened cornified cells. The first is known as the stratum mucosum, the second as the stratum corneum. These cornified cells have become such through gradual flattening of the deeper-lying cells, accompanied by a change in chemical constitution by which the cells are metamorphosed into keratin. These cells are gradually worn off and are replaced from the layers below.

In seeking a knowledge of the origin of the many-layered epidermis we must study the comparative ontogenetic and phylogenetic development of epidermis. At the time of gastrulation the ectoderm of mammals, from which alone the epidermis is derived, is unistratous. In this condition it is like the epidermis of all invertebrates. In this condition, too, it persists in *Amphioxus* to an adult stage. Quite early in the embryonic development of mammals, however, the nuclei arrange themselves in two layers as though forced to do so by pressure. Such a condition prevails in the human embryo of two months. (See EMBRYOLOGY, HUMAN.) The more superficial layer consists of flattened, transparent, hexagonal elements—the deeper layer of smaller cells; so that already a separation into a "stratum corneum" and "stratum mucosum" has appeared. This partly differentiated condition of the epidermis occurs in the amphibian larvæ. In the adult Amphibia the epidermis may become many-layered. The outer layer is cast from time to time in one piece in Amphibia and Reptilia. In birds and mammals the cornified cells are being constantly shed. In Amphioxus and fishes the epidermis is provided with a cuticula, while in some larval forms and in certain regions of adults it is ciliated. The epidermis is separated from the cutis by a basement membrane.

Types of Derma. The derma is composed of connective tissue and is derived from mesenchyme. This is a more compact layer than the looser subdermal tissue that lies still deeper. Three types of derma may be distinguished: (1) that of *Amphioxus*, consisting of a layer of flat cells, together with a gelatinous substance which they have secreted from their outer surfaces; (2) that of fishes and amphibians, in which the bundles of connective tissue run in two directions, parallel and perpendicular to the surface; (3) that of birds and mammals, in which the above-described distribution of connective tissue bundles is lost, and the boundary between derma and epidermis is no longer straight, but strongly corrugated. The derma sends up projections or papillæ into the epidermis. The derma of man belongs to this type, but in its ontogenetic development it passes through stages much resembling the first two.

Within the integument various structures are differentiated, such as pigment in granules or specialized cells; glands, both unicellular and multicellular—scutes or scales of reptiles, feathers of birds, hair, nails, hoofs, and claws; and dermal bones and teeth.

Dermal bones and teeth of higher vertebrates have probably been derived from the dermal bones or bony scales and the tooth structures of fishes. Neither *Amphioxus* nor cyclostomes possess any trace of an exoskeleton. Longitudinal and transverse rows of small denticles are present in selachians. Each denticle consists of a basal plate and a spine. The dentine of this scale is formed by the mesoderm, while the ectoderm forms the enamel which covers the denticle. The first impulse towards tooth formation seems to reside in the derma. The teeth of fishes are fused with the tooth cement. The teeth of some reptiles lie in sockets in the bone. The teeth of selachians lie in several rows upon the upper and lower jaws. Only one or two of these rows are functional at a time. The outer rows are replaced from time to time by the younger and inner rows. In mammals the process of replacement of teeth is limited in most cases to one occurrence, and the number of teeth is also limited. The gap in the number of teeth in selachians and mammals is bridged by the gradual reduction occurring in intermediate forms. Between scales and the teeth of selachians also intermediate forms occur. The dermal bones such as occur in the vertebrate skull, or in the pectoral arch of fishes, are homologous with the basal plates of the dermal denticles of selachians. They are probably formed by a fusion of such plates. The dermal skeleton is phylogenetically older than the endoskeleton, but it tends gradually to disappear the higher we ascend in the animal scale. Consult: Arnold Lang, *Text-Book of Comparative Anatomy* (2 vols., New York, 1895–06); T. H. Huxley, *Manual of the Anatomy of Vertebrated Animals* (ib., 1898); R. E. E. Wiedersheim, *Comparative Anatomy of Vertebrates* (3d ed., ib., 1907).

INTEGUMENT, IN PLANTS. A general term, but technically applied in seed plants to the specially developed coat of the ovule. The integument is usually not absolutely complete, leaving at the apex of the ovule a small opening through which the pollen tube enters, known as the micropyle, and at the opposite end of the ovule (chalaza) it is not distinguishable as a layer. The number of integuments varies in an interesting way through the great groups of seed plants. In general the ovules of Gymnosperms have a single massive integument. Among Angiosperms the Archichlamydeæ and the Monocotyledons usually have two integuments; while the Sympetalæ, the ranking group of Angiosperms, are characterized by the single massive integument. The evolutionary history of the integument, therefore, is a single massive integument at the beginning, later two integuments, and finally a return to the single massive integument. It is usually in connection with the tissues of the integument that the hard seed coat (testa) is developed. See OVULE.

IN'TELLECT (Lat. *intellectus*, understanding, from *intellegere*, *intelligere*, to perceive, from *inter*, between + *legere*, to choose, gather). The common name for mental processes concerned in the function of cognition. The division of mind into intellect and desire (*νοῦς* and *ὄρεξις*), made by Aristotle, was retained by later thinkers to the time of Tetens and Mendelssohn, who introduced the threefold division into cognition or intellect, feeling, and conation or will. This classification, first clearly defined and expounded in English by Hamilton, has since remained current and fundamental in the psychology of common sense. In the older psychology a further distinction was drawn, in various ways, between higher and lower forms of cognition (see FACULTY), and intellect was thus marked off from sense or from sense and imagination. Kant's "pure intellect" is, similarly, an intellect freed in its operations from the intermixture of sense.

In structural psychology (see PSYCHOLOGY) the word "intellect" is employed, in rough accordance with historical usage, as a classificatory term covering the doctrine of sensation and its derivatives; its treatment involves the study of the formation of perception and idea, the association of ideas, memory and recognition, imagination, thought and reasoning. The word "intellection" is sometimes reserved for the formation of concepts and judgments and for reasoning. (See the discussion of these processes under LOGIC.) Functional psychology marks off and subdivides the intellectual functions in various ways; but the classifications appear to depend rather upon logical analysis than upon direct observation of mind, and no proposed grouping has found universal acceptance. In animal psychology and in applied psychology the parallel concept of intelligence betrays a similar lack of definiteness.

Bibliography. Fritz Brentano, *Psychologie vom empirischen Standpunkte*, vol. i (Leipzig, 1874); James Sully, *Human Mind* (London, 1892); Alexander Bain, *Senses and Intellect* (ib., 1894); E. B. Titchener, *Experimental Psychology of the Thought Processes* (New York, 1909); G. T. Ladd, *Psychology, Descriptive and Explanatory* (ib., 1910); Josef Geyser, *Lehrbuch der allgemeinen Psychologie* (Münster, 1912). See INTELLIGENCE; INTELLIGENCE IN ANIMALS.

IN'TELLEC'TUALISM (from *intellectual*, from Lat. *intellectualis*, pertaining to the understanding, from *intellectus*, understanding). The philosophical theory that the intellect, rather than the affections or the will, is the fundamental process of consciousness and therefore, on an idealistic interpretation of reality, the ultimate basis and support of all existence. It stands opposed to voluntarism and to certain forms of mysticism (q.v.) which emphasize the epistemological and metaphysical importance of the affections. In very recent philosophy pragmatism (q.v.) and Bergsonism (see BERGSON) represent strong protest against intellectualism.

INTEL'LIGENCE (Lat. *intelligentia*, discernment, from *intellegere*, *intelligere*, to perceive, from *inter*, between + *legere*, to choose, gather). In general, the capacity to cognize or understand, and, as such, synonymous with intellect (q.v.). In current usage, however, the terms are roughly differentiated. The intellectual man possesses special ability in dealing with the abstract and theoretical, while the intelligent man is efficient in concrete situations and practical affairs. So we speak of animal intelligence, in the sense of an ability to profit from sensory experience, and we refuse to speak of animal intellect, as seeming to imply a power to deal with abstract ideas.

Some writers on applied psychology (see PSYCHOLOGY, *Applied*) maintain that intelligence is essentially involved only in the higher mental processes. Accordingly we find it defined as "the capacity for thinking and judging," or as "the general capacity of an individual consciously to adjust his thinking to new requirements." Sometimes only the synthetic side of thinking is emphasized, and "the activity of intelligence" becomes "the activity of intuitive synthesis." Degree of intelligence is supposed to be measurable by the success achieved in certain mental tests. See TESTS, MENTAL.

It is, however, an open question whether this general ability has any real psychological status. Some experimenters have found high correlations between the ranks of individuals in a group as assigned by very different mental tests, and also between ranking based upon tests and ranking based upon school marks or teachers' estimates. They have concluded that "all these performances, however different, depend partly upon a general common factor," viz., general ability or general intelligence. But good will on the part of the subject, ready understanding of instructions, and the like, may account for the consistently high rank attained by certain individuals; and the assumption that a number of identical simpler functions rather than a single general function is concerned, may explain the appearance of high correlations. Indeed, another experimenter "is tempted" to state that "there is *nothing whatever* common to all mental functions, nor to any half of them." In the face of such disagreement we can only say that the existence of a simple or separate "general function of intelligence" has as yet been neither proved nor disproved, though there is no reason to suppose that refinement of method may not ultimately lead to a definite result.

Bibliography. E. L. Thorndike, in *American Journal of Psychology*, vol. xx (Worcester, 1909); William Brown, *Mental Measurement* (Cambridge, 1911); E. L. Thorndike, *Educational Psychology* (New York, 1913); Ernst Meumann, *Vorlesungen zur Einführung in die experimentelle Pädagogik*, vol. ii (Leipzig, 1913); id., *Intelligenz und Wille* (ib., 1913); C. E. Spearman, *British Journal of Psychology*, vol. v (Cambridge, 1913); L. W. Stern, *Psychological Methods of Testing Intelligence* (Baltimore, 1914).

INTELLIGENCE IN ANIMALS. The ability of an animal to profit by individual sensory experience. (See Intelligence.) Thus, the ability of an animal to learn is usually taken as a measure of its intelligence. (See Learning in Animals.) Learning is most rapid in the presence of the free idea, since the immediate modification of behavior in accordance with a given end implies the presence of that form of experience. Thus, the free idea marks not only a high degree of mental development, but also a high degree of intelligence. (See Animal Psychology; Memory in Animals.) Inferential imitation, which is a rapid form of learning, involving the free idea, is therefore a criterion of intelligence. See Imitation in Animals.

Intelligence is frequently opposed to instinct by the opposition of the individually to the racially acquired, or of the finalistic to the mechanistic, or of the preperceived to the perceived. For a discussion of this topic, see Instinct, *Instinct and Intelligence*, and the references there given.

INTEM′PERANCE. See Alcoholism; Intoxication; Drunkenness; Temperance.

INTEN′SION OF A TERM. See Connotation.

INTEN′SITY OF SENSA′TION (from Lat. *intensus*, p.p. of *intendere*, to stretch out, from *in*, in + *tendere*, to stretch, Gk. *τείνειν*, *teinein*, Skt. *tan*, to stretch). One of the five attributes of sensation, the others being quality, clearness, extent, and duration. Theoretically every sensation must possess a certain intensity in order to enter consciousness. In the sphere of vision, however, there exist certain facts which make it advisable, according to some psychologists, to eliminate the attribute of intensity. Variation of the amplitude of vibration of the stimulus acting upon the retina means in every case (so they declare) a qualitative change in sensation; so that in this department of sense intensity merges in quality. This is the position of Hering and Hillebrand. König, on the other hand, maintains that there are two places in the spectrum (the one in the red and the other in the violet) where the qualitative change cannot be remarked.

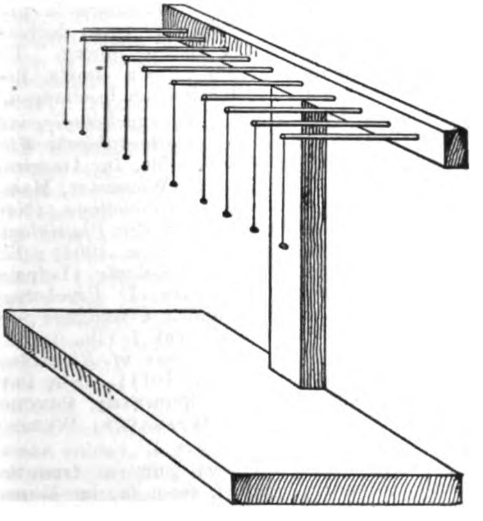

Fig. 1. Apparatus for testing sensitivity to touch.

The rack bears rods with cork pellets of different weights depending from them. The weight of the lightest of these cannot be perceived by the normal subject.

G. E. Müller has, furthermore, sought to overcome the difficulty by defining intensity as the distance of a sensation from its zero point. If two visual stimuli are both reduced, that sensation which reaches the zero point first has the less intensity. Müller also offers a theoretical explanation of the interdependence of visual quality and intensity. See Visual Sensation.

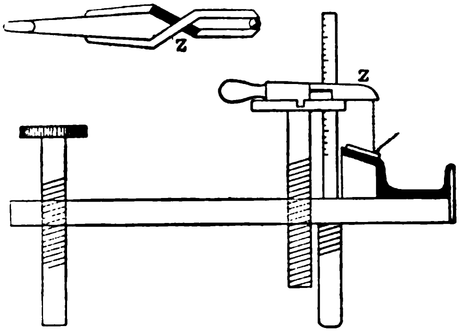

Fig. 2. Apparatus for determining the limen of sound intensity.

The forceps *Z* containing a leaden ball is placed on the head of a micrometer screw. The ball is released by pressure of the forceps and falls, along the dotted line, on the slanting surface, which is covered with cloth and on which is laid a glass or copper plate. If all other conditions remain the same, the height of the fall regulates accurately the objective intensity of the sound stimulus.

The main problems of intensity are two: (1) that of the minimal intensity of sensation, and (2) that of the change in intensity of stimulus which is just noticeable in sensation. There must be, accordingly, a determination for each sense department of the intensive limen (q.v.) and of the intensive sensible discrimination.

The liminal intensity of *pressure* depends upon the place stimulated. With cork pellets as weights, it has been found to be 2 mg. upon the forehead, temples, and back of forearm and hand; 5 mg. upon the nose, hip, chin, and abdomen; 10 mg. upon the fingers; and 1 g. on the nails. By stimulating individual pressure spots with fine hairs, Von Frey obtained much lower values, averaging for the calf 1.44 gr. mm. and for the wrist 1.28 gr. mm. (where gr. denotes the pressure exerted by the hair, and mm. denotes the radius of its cross section). The *pain* limen, as recorded by the hair method, gives the following values in gr/mm^2, where mm^2 denotes the area of the cross section of the hair: over the epicondyle of the humerus, 30; over the radius, 20; over the kneepan, 49; over the olecranon of the ulna, 40; on the conjunctiva of the eye, 2 to 7. On account of the variation of the actual temperature of the skin, or the physiological zero point, the examination of the intensive sensitivity to *temperature* presents great difficulties. The sensitivity is greater over the lateral surfaces of the body than in the median plane; and, as a rule, it increases from the periphery towards the trunk. The values for both cold and warmth vary from 0.2 to 1.1° C., measured from skin temperature. The liminal intensity for *taste* depends not only on the concentration of the solution, but also on the area stimulated, the amount of movement within the buccal cavity, and the general condition of excitability of the taste nerves prevailing at the time. Furthermore, the tip of the tongue is most sensitive to sweet, the base to bitter, the sides to sour, and the body to salt. The average limens have been found to be represented by the following figures, based upon a solution in 100 parts of distilled water: salt, 0.24; saccharine, 0.49; hydrochloric acid, 0.0063; sulphate of quinine, 0.00005. The intensity of *olfactory* sensations is likewise dependent upon the rate and manner of breathing, the rate of diffusion of the odorous vapor, and the general condition of the olfactory organs, as well as upon the amount of saturation of the air with the minute particles of the odorous substance. Current figures show that the limen is very low for some qualities; e.g., musk, 1/2000000 mg.; sulphureted hydrogen, 1/5000 mg.; bromine, 1/600 mg. In *audition* the existence of absolute silence is to be doubted. Most authorities agree that we can never get free from the noises caused by the pumping of the blood through the ears. Closing the ears, or standing with open ears near any reflecting surface, only intensifies the sound. The liminal intensity for *noise* may, then, be regarded as that intensity which is just perceptible above this internal sound. A cork pellet weighing 1 mg. and falling through 1 mm. upon a glass plate can just be heard at 91 mm. from the ear. A *tone* from a pipe giving 181 vs. per second is audible when the air particles set in motion by it possess an amplitude of excursion of only 0.00004 mm., and the mechanical work done by it upon the ear is 0.0033 mg. mm. Other investigations have placed the latter value much lower. The sensitivity to high tones is in general greater than that to low tones. The investigation of the limen of *light sensation* reveals a difficulty analogous to that cited in connection with the auditory limen. The existence of the "idioretinal light" precludes absolute sightlessness, as the "idioaural noise" precludes absolute silence. For external stimulation, the limen may be put at the illumination of black velvet by a stearin candle 9 meters distant. It has also been estimated (though incorrectly; the estimate is too high) at 1/300 the light of the full moon. In one-half second this light exerts upon the retina the energy required to raise 1/15 mg. of water 1/000000000000 of a degree C. For the liminal sensitivity to *articular* sensations, see MOVEMENT, PERCEPTION OF.

The investigations of the intensive sensible discrimination are included under Weber's law, a uniformity which may be stated thus: under constant conditions of experimentation, the ratio of the increment of stimulus, necessary to give a noticeably different sensation, to the existing stimulus is constant. The problem is, then, to discover whether this principle of the constancy of the relative difference limen is applicable to every sense department, and to ascertain the numerical value of the constant in those departments in which its applicability is established. E. H. Weber himself determined the constants for *pressure* as follows: with simultaneous application of the weights to both hands, 1/3; with successive applications to the same hand, 1/14 to 1/30; with simultaneously lifted weights (involving both pressure and strain sensations) 1/15 to 1/20; with weights lifted successively with one hand, 1/40. These figures have been modified by subsequent investigators; and indeed, since the limen varies with variation of experimental conditions, it is clear that all such measures have but a very rough significance unless accompanied by a statement of the circumstances under which they were obtained. The discriminability of *temperature* intensities varies with the part of the body tested, and especially, it seems, with the thickness of the epidermis. It varies also with the extent of the skin surface stimulated. With the whole hand involved, moderate temperatures differing by 1/20° C. may be discriminated. The region of finest discrimination seems to be that between 26° and 39° C. Cooling is noted sooner than warming, in the proportion of three to two. Of *taste*, little is known save that Weber's law holds approximately for bitter and salt. The phenomenon of "taste contrast" is a source of unavoidable disturbance in this field. A careful survey of the olfactory sense has confirmed the applicability of Weber's law to *smell*, and established the constant at 1/3 for 36 per cent of the substances tested and at 1/4 for 26 per cent. Most successful results are those obtained in audition. The relative sensible discrimination for *noise*, tested by the gravity phonometer or the sound pendulum, remains constant at 1/3 within a wide range of intensities. Technical difficulties impede the observation of *tones*, but enough has been done to show that, at least within the central part of the scale, variations in tonal intensity follow the law. Work with *light* is subject to many sources of error—difficulties in securing standard conditions of adaptation, accommodation, etc. The many investigations which have been completed do not, therefore, concur as to the constant, which is variously estimated at 1/60, 1/100, 1/120, to 1/230. The value 1/110 may be assumed as a fair average. Of interest in this connection is an apparatus which can be employed to demonstrate the existence of the constancy or to indicate its numerical value. "Masson's disks" are white disks, on one radius of which a number of heavy black sections are marked. Upon rapid revolution there is produced a series of concentric gray rings decreasing in darkness towards the periphery. The same ring remains, within certain limits, just visibly gray when the illumination is changed.

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INTENT′ (Lat. *intentus*, purpose, from *intendere*, to stretch, intend, from *in*, in + *tendere*, to stretch; connected with Gk. *τείνειν*, *teinein*, Skt. *tan*, to stretch, and ultimately with Eng. *thin*). In law, the purpose or design with which an act is done. Ordinarily the legal consequences which flow from acts are entirely independent of the intent or motive with which the acts are performed. This is true of all violations of the general rights, known as rights in rem, more commonly described as property and personal rights. Thus, the right to be free from trespass and the right to be secure from violence or from arbitrary arrest do not depend in the least on the motive or intent of the person violating them. It is only in those cases in which the rights claimed flow from the engagements of a party, or in which the law has, from motives of its own, attached consequences to the intent with which an act is performed, that intent acquires any legal significance. Obviously any rights claimed under a will, a deed, or a contract flow from the intent of the person executing it, and, in certain classes of torts, a malicious or fraudulent motive may constitute the gravamen of the offense complained of.

But in all of these cases it is not the actual and secret motive, but the expressed intent which determines the legal character of the act in question. This is the real meaning of the rule which forbids the introduction of parol evidence to contradict or vary the terms of a written instrument. The grantor of land is not permitted to show that he intended to convey another and different parcel of land. He must stand by the intent as expressed in his deed. So, in a will, a legacy to A cannot, by proof of a contrary intention on the testator's part, be converted into a gift to B, nor can one who has sold a horse for $100 show that he intended to charge $150 for the animal. Analogous to this principle is the rule applied in those wrongs in which intent is an element, as in malicious mischief and certain cases of defamation and negligence. The person committing the injury is held to have intended the reasonable and probable consequences of his acts, and cannot exonerate himself from liability by showing that his intention was really of an innocent or benevolent character.

There are other classes of cases, however, in which the actual intent with which an act was performed is a proper matter for judicial inquiry. This is especially so in cases where the wrongful intent is the gist of the wrong, as in crime, deceit, and, under certain circumstances, in fraudulent conveyances. See Crime; Motive; Deceit; Fraudulent Conveyance; Interpretation; and the authorities there referred to.

IN'TERAC'TION. The relation between two or more things or systems which mutually influence one another, and especially the theoretical relation of mind and body which involves such influence. Consult, for a typical statement of the theory of interaction, R. H. Lotze, *Microcosmus* (Leipzig, 1856–64; trans., Edinburgh, 1898). See Mind and Body; Parallelism.

INTERAM'NA. The name of several cities in ancient Italy. 1. Interamna Nahartium. (See Terni.) 2. Interamna Prætuttianorum. (See Teramo.) 3. Interamna Lirenas, 5 miles southeast of Aquinum, near the modern Pignataro Interamna. This town was founded as a Roman colony, in 312 B.C., to serve as a base of operations against the Samnites. On its site Roman ruins and ancient inscriptions have been found.

INTER'CALARY. A supplementary day or month. See Calendar; Bissextile; Leap Year.

IN'TERCEL'LULAR SYSTEM (from Lat. *inter*, between + Neo-Lat. *cellula*, *cellule*, dim. of Lat. *cella*, cell). The system of spaces in plants, often continuous, between the cells. They may be formed by the splitting of cell walls (schizogenously) or by the breaking down of masses of tissue (lysigenously). Spaces formed by splitting are found only in the higher plants and do not occur at all in plants below the mosses. When a tissue is very young, its cells are angular and in such close contact that there are no intercellular spaces; but as the cells grow older, they may become rounded, and the common walls may split at the angles, thus producing intercellular spaces of various extent. When the spaces are very large, as in the stems of water lilies (*Nymphæa*), they are called air chambers. Smaller intercellular spaces are almost universal in the spongy parenchyma of leaves, in the pith of stems, and in older parenchyma generally. To this category belong many glandular passageways, like the resin ducts of conifers, the mucilage ducts of cycads, the gum-resin ducts of the umbellifers, etc. Spaces formed by the breaking down of masses of tissue give rise to the hollow stems of grasses and many other plants. The cavities in the leaves of quillworts (*Isoetes*) and many other plants are also formed in this way. The oil glands of the orange and lemon, many glands on leaves which appear to the naked eye as "pellucid dots," the gum cavities in the tissues of cherry trees, are all examples of lysigenously formed glands. See Morphology; Aëration.

IN'TERCES'SION, Doctrine of (Lat. *intercessio*, from *intercedere*, to intervene, from *inter*, between + *cedere*, to go). A doctrine of theology, based on certain passages of Scripture which are held to represent Christ, after having finished His redemptive work on earth and ascended into heaven, as pleading with God on behalf of those whom He has redeemed (Rom. viii. 34; Heb. vii. 25; 1 John ii. 1). It was not meant to imply, however, that God needs to be interceded with, as if He were still reluctant to forgive men, or that Christ's intercession makes Him more merciful than before. The intercessory work of Christ is to be regarded rather as His activity in behalf of all men, and especially of His followers. The doctrine of the intercession of Christ is held alike by Protestants and Roman Catholics; but the latter, in addition, believe in the intercession of the Virgin and the saints, on which see Saint. Islam also has a doctrine of the intercession of Mohammed for his followers on the day of judgment.

IN'TERCOLUM'NIA'TION (Lat. *inter*, between + *columnar*, column). The clear space between two columns, measured where the diameter is greatest, sometimes, but incorrectly, used of the spacing measured from axis to axis. In classic and neoclassic architecture names are given to certain spacings according to Vitruvius (bk. iii, chap. 2) as follows: *picnostyle*, to an intercolumniation of 1½ diameters; *systyle*, of 2 diameters; *eustyle*, of 2¼; *diastyle*, of 3; *aræostyle*, of more than 3 diameters. See Orders of Architecture.

IN'TERDICT (Lat. *interdictum*, prohibition, from *interdicere*, to forbid, from *inter*, between + *dicere*, to say, Gk. δεικνύναι, *deiknynai*, Skt. *diś*, to point out; connected with Goth. *gateihan*, to tell, OHG. *zihan*, Ger. *zeihen*, AS. *teon*, to accuse). An ecclesiastical censure or penalty in the Roman Catholic church, which deprives the faithful of certain sacraments (q.v.), of participation in the celebration of the divine offices, and of ecclesiastical burial. Interdicts may be of three kinds—personal, local, and mixed. When the censure affects only some designated individuals, it is called a particular personal interdict. When it affects a whole community or corporation, it is called a general personal interdict. A local interdict affects only such individuals as are present in a designated place and can be avoided by removing from the place. A particular local interdict affects only a single monastery, church, or seminary. A general local interdict applies to an entire parish, city, province, or kingdom. In such general censures certain churches are usually excepted. Lastly, mixed interdicts affect both a locality and all its inhabitants wherever they may go, or a person and any place in which he or she may be. The last is called an ambulatory interdict. The principle on which this ecclesiastical penalty is founded may be traced in the early discipline of public penance, by which penitents were for a time debarred from the sacraments, and from the privilege of presence at the celebration of the Eucharist. It grew out of excommunication (q.v.) and at first was called a general excommunication. Then it usually deprived the persons who dwelt in the excommunicated place of all sacraments. From 375 on, there are instances of such general excommunications. But the interdict proper took its peculiar form, although not its name, in northern France in the ninth century. It was adopted by the Popes about the middle of the eleventh century, and the term "interdict" was used in its technical meaning by 1031. It came into use as an ordinary Church censure in the frequent conflicts of the ecclesiastical and civil power. It was designed to awaken the popular conscience to the nature of the crime, by including all alike in the penalty with which it was visited. In this way public pressure could be brought upon the rulers who had offended. The most famous interdicts are those laid upon England in 1208, upon France in 1200, and on Venice in 1606. The description of England under the interdict named, as detailed by some of the contemporary chroniclers, presents a striking picture of the condition of a country where the interdict was obeyed. It would be a great mistake, however, to suppose that during the continuance of an interdict the people were entirely destitute of spiritual assistance. The severity had been greatly lessened by the middle of the eleventh century; it was permitted to administer baptism, confirmation, penance, and the Eucharist in all cases of urgency; privately to confess and absolve all who were not personally the guilty participators in the crime which the interdict was meant to punish; to celebrate marriage, with only the witnesses present; and to confer orders in cases of necessity. Gregory IX allowed mass to be said once a week, behind closed doors, in order to consecrate the host for the use of the sick; Boniface VIII permitted the offices to be said in the churches, but the laity were to be excluded; public celebration of services was allowed on Christmas, Easter, Pentecost, the Assumption of the Blessed Virgin, the festival of Corpus Christi, the festival of the Conception, and a few other occasions. The Council of Basel enacted very stringent rules as to the use of this penalty, and in later times the general interdict has been entirely disused. The interdict on Venice in 1606 is often cited as the last one pronounced, but occasionally, in very special circumstances, and to mark the horror of the church for some enormous crime, later instances are recorded in which a particular place or church has been visited with the penalty of a local interdict. Interdict differs from *excommunication*, in that those under the censure are not given over to eternal damnation. It differs also from *suspension*, which applies only to ecclesiastics.

Consult: Ducange, *Glossarium ad Scriptores Mediæ et Infimæ Latinitatis* (3 vols., Paris, 1678; ed. by Favre, 10 vols., Niort, 1884-87); Kober, "Das Interdict," in *Archiv für katholisches Kirchenrecht*, vols. xxi, xxii (Mayence, 1869); Hinschius, *Das Kirchenrecht*, vol. v (Berlin, 1895); E. B. Krehbiel, *The Interdict: Its History and its Operation* (Washington, 1909).

INTERDICT. In the civil law, a judicial process analogous to the injunction of English and American law. In its earliest form in Roman law it was a peremptory decree of the prætor, restraining any interference with property the right to the possession of which was in dispute. It seems still, in the modern civil law, to be generally restricted to prohibitions as to the possession of property, though in Scotland the term is applied to any process of the Court of Session restraining the performance of an unlawful act. An interdict is not, however, limited to the prohibition of contemplated acts, but may also be employed to compel the restitution of property of which a person entitled to possession has been forcibly deprived, and to compel the presentation, or "exhibition," of an account. Interdicts are accordingly classified, according to the purpose sought to be effected, as prohibitory, restitutory, and exhibitory. See INJUNCTION; and consult the authorities referred to under CIVIL LAW; and John Erskine, *Institute of the Law of Scotland* (Edinburgh, 1773; new ed., 1898).

IN'TERDIC'TIO A'QUÆ ET IG'NIS. See EXILE.

IN'TERDIC'TION. A process of the civil law employed for the purpose of depriving a person who is *non compos mentis* of the control of his property and, on occasion, of other civil rights. The process is analogous to the inquisition in lunacy (q.v.) of English and American law, whereby the incapacity of a person to manage his own affairs may be inquired into and the management of his interests committed to a guardian or trustee. The jurisdiction thus exercised is as old as the Twelve Tables, but it was originally employed only to restrain prodigals from dissipating their estates. By modern codes it is generally confined to cases of imbecility and lunacy. In such cases interdiction may be only partial, the interdicted person being forbidden to sue, to borrow, to pledge or hypothecate his property, or to make any conveyances without the consent of the court; or it may be complete, in which case a guardian or curator is appointed and the management of the affairs of the interdicted person committed to him. The practice in Scotland, Louisiana, and Quebec is substantially the same as in the continental states, whose legal systems are borrowed from that of Rome. Consult the authorities referred to under CIVIL LAW; also John Erskine, *Institute of the Law of Scotland* (Edinburgh, 1773; new ed., 1898).

IN'TERES'SE TER'MINI (ML., interest in a term). At the common law, the interest which a tenant for years has in the lands leased to him, before he has entered upon them. The lease is regarded as conferring only an inchoate title or estate, which requires an entry by the tenant to perfect it. But though the *interesse termini* falls short of being a complete leasehold estate, it is yet more than a mere chose in action (q.v.) or right of entry (q.v.). It is a true interest or estate, a right in rem (q.v.), capable of alienation and of transmission upon the death of the tenant to his personal representatives, and generally in the United States the same remedies are available for its protection and recovery as in case of the perfected estate. The principal common-law disability of the tenant for years who had not entered into possession was that he was incapable of acquiring the full legal title by release from the lessor. See LEASE; LEASEHOLD; RELEASE.

IN'TEREST (OF. *interest*, Fr. *intérêt*, interest, from Lat. *interest*, it concerns, 3d pers. sing. pres. ind. of *interesse*, to concern, from *inter*, between + *esse*, to be). A certain profit or premium for the use, forbearance, or detention of money. In spite of the natural feeling that the payment of interest was a hardship, and that to exact interest from a borrower was to take an unfair advantage of his necessities, all the chief peoples of antiquity recognized that interest might lawfully be stipulated in connection with a loan and might be awarded in the discretion of the court even when no such stipulation had been made. Babylonian tablets show ordinary loans at moderate interest, and also maritime loans, in which the claim of the creditor for his principal was extinguished by the loss of the ship and on which a much higher rate of interest was exacted. It was very common among the ancient Hebrews, and the Mosaic law contains a prohibition against the taking of usury (or interest, as it should have been translated) from the Jews, but permitted it as to all other races. The Greek and the Roman laws recognized interest. The Romans called it payment for use (*usura*) and assimilated it to the natural yield or increase derived from organic nature by classing it, with rent, among civil or legal fruits (*fructus civiles*). They did not limit it to the loan of money exclusively: any generic or fungible things, like wheat, wine, or oil, could be stipulated.

Aristotle speaks of it, but condemns it as vicious, holding that money is "naturally barren" and that to make it "breed money" is preposterous and a perversion of the end of its institution, which, he declared, was to serve as a medium of exchange and not for purposes of increase. Through a misconstruction of the real intent and purpose of the law of Moses, which was clearly a political and not a moral precept, and following the curiously narrow philosophy of Aristotle on this subject, the Christian Church and laymen early condemned the custom and held any interest to be usury and against good morals. The secular law in Christian nations naturally followed the ecclesiastical in those times, and the taking of interest was forbidden in England from the reign of King Alfred in the ninth century to the time of Henry VIII. The prohibition of interest led, of course, to many evasions; and to one of the most ingenious and successful of these the word "interest" owes its modern technical meaning. At Roman law, interest (*quod actoris interest*, the difference to the plaintiff) meant damages. The Church itself did not deny that one from whom money was wrongfully withheld was entitled to damages. Contracts for the repayment of money loaned were accordingly so drawn as to insure a technical default on the part of the borrower, and the damages to be paid on default were stipulated in advance. The prohibition of interest led also to the development of new legal institutions like the *commandita*, or silent partnership, in which payment for the use of money took the form of a share of profits. The prohibition of interest was generally rescinded by secular legislation before or at the close of the Middle Ages; in Germany, however, not until 1577. By the Statute of 37 Hen. VIII, c. 9, in 1545, interest to the amount of 10 per cent per annum was permitted. This was accomplished in a negative manner by simply providing penalties for taking more than that amount, thus giving only an indirect sanction to taking it at all. By Statute of 12 Anne II, c. 16, 5 per cent was fixed as the maximum amount of interest which could be demanded. In the United States the demand of interest on money due has always been recognized as just. However, the right to interest exists only by virtue of such statutes or by agreement of parties and does not follow necessarily as a legal right from the mere fact that one has another's money in his possession or owes him money by contract. For example, in the absence of statute or agreement, if A loans B $100 to be paid on demand, A may demand payment five years hence, but is not entitled to interest for that time; and even under such statutes interest does not begin to accrue until money is due and payable, because not until that time is there an unjust detention from the owner. Previous to the debt becoming due, the matter is, in contemplation of law, regulated by agreement of the parties.

The statutes in most jurisdictions provide that interest shall be allowed at a fixed rate on all sums when they become due, as on a debt for goods sold and delivered when the period of credit has expired. It is not customary, however, to exact interest in such cases unless the creditor is forced to sue on his claim. In some States and in England interest is allowed in certain tort actions on the amount of the damages awarded from the time the claim accrued, but this is not the general rule.

A distinction is usually made between the rate which will be allowed by law, usually called the legal rate, where it is not agreed upon by the parties or where allowed by operation of law, as on a judgment, and the maximum rate which may be stipulated for by contract, sometimes known as the conventional rate. For example, in Ohio the statutes provide that 6 per cent shall be allowed on all sums on which interest is chargeable by operation of law, as on a judgment after its entry, and on sums due where no rate is agreed upon by the parties, whereas 8 per cent may be legally demanded if provided for by express contract.

In Great Britain, after the existence of rigorous measures against excessive interest for centuries, all statutes against usury and fixing rates of interest were repealed by the Act of 17 and 18 Vict., c. 90 (1854). The power of the court of equity to relieve against unconscionable bargains as to interest still exists; and in 1900, by the Money Lenders' Act, special provision was made for setting aside a contract made with a professional lender of money where an oppressive rate of interest is charged. In France the legal rate is 5 per cent, but more may be demanded by contract.

The following are the rates of interest fixed by law January, 1914, in the States and Territories of the United States:

STATES AND TERRITORIES	Legal rate per cent	Rate allowed by contract per cent
Alabama	8	8
Alaska	8	12
Arisona	6	10
Arkansas	6	10
California	7	any
Colorado	8	"
Connecticut	6	6
Delaware	6	6
District of Columbia	6	10
Florida	8	10
Georgia	7	8
Idaho	7	12
Illinois	5	7
Indiana	6	8
Iowa	6	8
Kansas	6	10
Kentucky	6	6
Louisiana	5	8
Maine	6	any
Maryland	6	6
Massachusetts	6	any
Michigan	5	7
Minnesota	6	10
Mississippi	6	10
Missouri	6	8
Montana	8	any
Nebraska	7	10
Nevada	7	any
New Hampshire	6	6
New Jersey	6	6
New Mexico	6	12
New York	6	6
North Carolina	6	6
North Dakota	7	12
Ohio	6	8
Oklahoma	6	10
Oregon	6	10
Pennsylvania	6	6
Rhode Island	6	any
South Carolina	7	8
South Dakota	7	12
Tennessee	6	6
Texas	6	10
Utah	8	12
Vermont	6	6
Virginia	6	6
Washington	6	12
West Virginia	6	6
Wisconsin	6	10
Wyoming	8	12

These rates are occasionally changed by statute, but there has been comparatively little variation in recent years. An interesting fact is that several Eastern States, as Massachusetts, have removed all limitations on rates by contract, and in New York any rate may be charged by contract on loans exceeding $5000 payable on demand, and known to the financial world as call loans.

The usual method of calculating interest is to compute it on the principal sum originally due for the period which has elapsed at the time of computation, but by agreement compound interest may be allowed; i.e., the arrears of interest for each year are added to the principal sum and interest for the following year is computed on this accumulation, and so on, thus giving the investor interest upon interest. It is customary to compute interest in this manner upon deposits in savings institutions.

In popular usage interest is the payment made by a borrower for the use of a sum of wealth for a definite period of time; it is expressed as the ratio which that payment bears to the value of the wealth loaned—the principal. In economic theory the term "interest" is used in a broader sense and signifies the return for the use of capital, whether the employment of capital is made directly by its owner or by another person to whom it has been loaned. In the latter instance it appears as a sum paid by the borrower over and above the amount received in loan. It is calculated at a certain percentage of the capital to be paid annually. Economists distinguish from interest that part of the gross product which is necessary to replace the original capital, and the extra return to capital which appears in enterprises involving risk of loss, as well as chance gains and the abnormal return due to superior management. The last three forms of income are usually classed under the head of profits (q.v.).

Loan or contract interest may be paid for wealth for immediate consumption as well as for wealth which is employed as capital. In the earlier stages of industrial development, when little capital was used, loans normally assumed the former character. Money was loaned to those persons who were in temporary distress or to spendthrifts who desired to anticipate future revenues. In either case the repayment of the principal was a hardship and the additional payment of interest, usually calculated at a high rate because of uncertainty of repayment or because of the necessities of the borrower, was peculiarly vexatious. This fact is a partial explanation for the canonical and civil prohibitions of interest mentioned above. This was the case in ancient and mediæval nations, and much the same attitude survives in backward communities of the present day. With the development of capitalistic production the gain to the borrower who invests the wealth borrowed in productive enterprise became so obvious that the opposition to interest declined and no longer exists among business men.

In competitive industry there is a close connection between loan interest and the return to capital. It is obvious that a justification for loan interest lies in the fact that had the owner of the capital employed it himself he could have secured a return from its use. When he turns it over to some one else he foregoes this return and must be compensated for it. It is immaterial whether the lender would have used his capital in productive enterprise or whether the borrower does so. The fact that it might be so used establishes a claim for compensation. Such an explanation does not make it clear why the owner of capital secures a return for its use, but admitting that in the present economic order he does so, it explains why the borrower pays interest upon a loan. It also serves to indicate certain limits upon the rates of interest under normal circumstances. Lenders cannot demand more, nor can borrowers expect to pay less than the return normally expected from the employment of capital in productive industry.

Explanation of the phenomena of interest must be sought in the laws which make it possible for capital to produce a net return. A large number of theories have been advanced to explain the existence of net return to capital. (See POLITICAL ECONOMY.) We may notice here three theories which have attained the largest following: (1) the *abstinence* theory, which regards interest as a reward for the abstinence which the capitalist exercises in employing his wealth for productive purposes instead of consuming it unproductively; (2) the *productivity* theory, which lays emphasis upon the fact that capital represents an instrument which greatly increases the efficiency of labor, and therefore normally entitles its owner to a reward; and (3) the *exploitation* theory, which regards labor as the sole source of wealth, the income known as interest being merely a tribute to the capitalists who hold a monopoly of the opportunities for employment.

In recent economics a variety of the abstinence theory has gained a large following under the leadership of Professor Böhm-Bawerk, who explains interest as a result of the universal undervaluation of future goods as compared with present goods. The productivity theory finds its foremost champion in Prof. J. B. Clark. In his view capital, as a limited agent capable of increasing the output of industry, is productive in the same sense in which labor is productive, and the measure of this productivity is the loss to industry which would result if the least important portion of capital were withdrawn. In explaining the laws which govern interest Prof. Alfred Marshall and his followers take a position midway between the productivity and abstinence schools. The rate of interest depends upon the relations between the demand and the supply of capital. The demand for capital varies with the opportunity for its productive employment; the supply varies with the readiness of individuals to postpone consumption to a future date. If productivity is high, the inducement to save is correspondingly great, and consequently the supply of capital increases. With increase in supply of capital, its productivity declines, until no reason exists for further creation of capital. The rate of interest, therefore, tends to become fixed at the point where the productivity of capital is just sufficient to compensate those who save for the disadvantages which attend the postponing of consumption, or "waiting."

In Böhm-Bawerk's theory the productivity element is admitted among the causes for the undervaluation of future goods. Since present goods can be used to institute fruitful productive operations requiring a long time for their consummation, present goods are "technically superior" to future goods. The theory of Böhm-Bawerk, stripped of all productivity implications, serves as the basis of the interest theories of F. A. Fetter and Irving Fisher. In the view of these economists, preference for present goods is the sole possible explanation of interest.

Bibliography. Eugen Böhm-Bawerk, *Kapital und Kapitalzins* (2 vols., Innsbruck, 1884–89; trans. by William Smart, New York, 1890–91); Marx, *Capital* (London, 1887); Marshall, *Principles of Economics* (3d ed., ib., 1895); Clark, *Distribution of Wealth* (ib., 1899); Fetter, *Principles of Economics* (ib., 1904); Gonne, *Interest and Saving* (ib., 1906); Fisher, *The Nature of Capital and Income* (ib., 1906); id., *The Rate of Interest* (ib., 1907); Eugen Böhm-Bawerk, *Positive Theorie des Kapitales* (Innsbruck, 1912).

INTEREST, IN PSYCHOLOGY. An affectively toned attention, or a relatively permanent susceptibility to that state. We say popularly that an accident or a mysterious event "excites" our interest, or that a person whose attention goes easily to chess problems and coins "has" or "shows" an interest in chess or in numismatics. The psychologist, however, must keep the two meanings of the term separate.

The problem of interest, in the first sense, is the problem of the relation of affective processes to the clearness of sensory processes in attention (q.v.). Several views as to the nature of this relation have been held. It has been said, e.g., that feeling is a condition of (or an incentive to) attention. But, if that were the case, feeling would necessarily precede attention; and since the verdict of introspection is directly against such a sequence, this view cannot be accepted. It has been said, again, that feeling and attention are merely two aspects of the same state; feeling is the "reaction of apperception upon sensory contents." The universal concomitance of feeling and attention is here affirmed, and the existence of a state of attentive indifference is denied. The contention seems plausible. We are wont to think of attention as a sporadic and occasional matter; we are now attentive, now inattentive; and when we attend, it appears, we always feel. Attention, however, defined psychologically as clearness, is not an occasional, but a normal, state of mind; what is popularly called inattention is, in fact, only an indication of attention to "something else." If we recognize this fact, and if we distinguish carefully between feeling and the organic sensations with which it is likely to be confused, we find that states of attentive indifference are in reality frequent. This second view, therefore, must also be given up. A third view, which admits a close relation between feeling and attention without maintaining their universal concomitance, is still possible. We may suppose that, originally, attention did imply feeling; the conditions of primitive attention were conditions of a powerful impression of the nervous system; and such conditions are very likely to lead to the arousal of feeling. But the attentive consciousness, like the action consciousness (see ACTION; IMPULSE), seems to have become simplified in the course of development; so that we now have what we may call a mechanized or reflex attention, without affective concomitant. Interest, in fine, arises only when the conditions both of attention and of feeling are given, and then only when the balance is poised between the attentive indifference with which we meet the habitual and customary, and the dominance of consciousness by emotion. See EMOTION.

Taken in the second sense, interest sets for psychology the problem of the conditions of special susceptibility to emotively tinged attention. Why does one man delight in mechanical, another in artistic, objects and activities? The conditions of such an interest are to be found in mental constitution (q.v.), in the inherited and acquired determining tendencies which facilitate and inhibit associations. (See DETERMINING TENDENCY; ASSOCIATION OF IDEAS.) Herbart and his followers have made this sort of interest of primary importance in the theory of education. The child, they say, cannot learn things entirely new, but only such things as can be assimilated to his present stock of ideas. (See APPERCEPTION.) Interest is most easily aroused where an object has many relations to past experience. Instruction, therefore, should build carefully on the foundations of knowledge already present and in the direction of preëxisting interests. A correct theory of education, however, must take into account the fact that natural interests are not necessarily the most valuable, and that voluntary attention is a necessary stage of mental progress. There is, moreover, at times a pedagogical advantage in confronting the pupil with statements which are wholly novel, and perhaps even contradictory of his previous ideas; for these ideas may well be incorrect, and novelty of content tends to make a statement impressive.

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IN'TERFER'ENCE (from *interfere*, from OF. *entreferir*, to exchange blows, Fr. *interférer*, to interfere, from Lat. *inter*, between + *ferire*, to strike). In any medium capable of transmitting waves the effect at any point when two trains of waves are passing simultaneously is the sum of the effects which each wave by itself would produce, provided that the amplitudes of the waves are small compared with the wave lengths; so that the resultant motion is the combination of the two waves. This is called interference. The interference of two trains of waves on the surface of water is often seen. The phenomenon of beats in acoustics (q.v.) is due to interference. Waves in all media, air, water, the ether, etc., can be made to interfere; and, conversely, if interference phenomena occur in connection with any physical action, it is evident that this action must be due to wave motion. One of the most important illustrations is the formation of "stationary vibrations," or "standing waves," e.g., the vibrations of air in an organ pipe, Lippmann's method of color photography, etc. The first application of the principle of interference in the explanation of physical phenomena was made by Newton in his *Principia*, in accounting for a remarkable tidal effect described by Halley in the *Philosophical Transactions* for 1684. The next applications were made by Thomas Young in 1800 in explaining various phenomena in acoustics, notably that of beats. Young almost immediately extended the principle to many observations in the field of light. He was convinced that light was due to waves in the ether and devised several new experiments in order to test his theory.

One of the simplest cases of interference is when two identical trains of waves are sent out from two vibrating sources close together. At any point whose distances from the two sources differ by half a wave length, by three half wave lengths, or by any odd number of half wave lengths, the action of one train of waves is permanently neutralized by that of the other; whereas, at any point whose distances from the two sources are equal, or differ by a whole wave length, or by any number of whole wave lengths, the action is twice what it would be, due to either train of waves by itself. Thus, let light of one definite wave length, i.e., of a definite color, e.g., yellow, be passed through a narrow slit in an opaque screen and fall upon a second opaque screen in which there are two other narrow slits parallel to the first and at equal distances from it; if this pair of slits are close together, and if the light from them falls upon a distant screen of some kind, there will be bands of colored light upon it, separated by dark bands where the action of the waves from one slit is neutralized by that of the waves from the other. The device of having the two slits illuminated by light coming from the first slit is in order to secure two *identical* sources of waves; for if the sources were to send out different waves, or waves without any definite phase relation, there could be no permanent interference. In a perfectly similar manner waves in the air produced by whistles may be made to give "interference bands" of silence and sound. The distance apart of the bands in any case evidently varies directly as the wave length of the trains of waves. (See LIGHT.) This experiment was devised by Thomas Young in order to test the nature of the agency causing light.

Another case of interference is seen in the beautiful colors of soap bubbles, of thin films of oil on water, etc. These colors are due to the fact that, when white light falls upon the thin transparent film, some is reflected at the first surface, and of the light that enters the film some is reflected at the second surface and the rest transmitted. There are, of course, a series of internal reflections, and, looking at the film from either side, the eye receives waves which have passed over paths of different lengths. There is also a difference in the character of the reflection at the two surfaces of the film, which is equivalent to a difference of path. If the difference in phase is such as to amount to half a wave length or any odd number of half wave lengths of waves of any definite wave length, they will be absent from the light received by the eye. But white light from which any train of waves is absent will appear colored, having the color complementary to that of the absent waves. Since energy cannot be destroyed, the colors seen on viewing the film by reflected and by transmitted light will themselves be complementary, assuming that the film itself does not absorb any light.

INTERFERING. See HORSE.

IN'TERIM (Lat., in the meantime). The name given to three attempts made in Germany during the Reformation to draw up a formula which might serve as a basis of agreement between Catholics and Protestants until the points of difference could be decided by a general council. The *Ratisbon Interim* was the result of the deliberations of a commission appointed during the Diet of Ratisbon in 1541, of which Eck, Pflug, and Gropper were the Roman Catholic, and Melanchthon, Bucer, and Pistorius the Protestant members. On the greater number of doctrinal points the commission found it possible to agree on terms which might be deemed consistent with the views of both parties; but as to the sacraments and the power of the Church, the differences were irreconcilable. At the next Diet at Augsburg in 1548 a new interim at the command of the Emperor, Charles V, was prepared by Pflug, Helding (Sidonius), and Agricola. It is called the *Augsburg Interim*. In it the use of the cup by the laity, the marriage of priests, and some other minor things were conceded to the Protestants; but it met with very general opposition, particularly in the north of Germany, and was revoked in 1552. By the exertions of the Elector Maurice of Saxony, a third interim, the *Leipzig Interim*, or the *Great Interim*, was adopted at the Diet of Leipzig, Dec. 22, 1548, which guarded the Protestant creed, but admitted great part of the Roman Catholic ceremonial and recognized the power of popes and bishops when not abused. It was the work of Melanchthon, Bugenhagen, Cruciger, Major, Eber, and Pfeffinger. It proved no more satisfactory than those which had preceded it and gave rise to the adiaphoristic controversy. (See ADIAPHORISTS.) Consult: Druffel, *Briefe und Acten zur Geschichte des 16. Jahrhunderts* (Munich, 1875); Beutel, *Ueber den Ursprung des Augsburger Interims* (Dresden, 1888); T. M. Lindsay, *History of the Reformation*, vol. i (New York, 1906–07).

INTE'RIOR, DEPARTMENT OF THE. One of the 10 executive departments of the United States government, whose chiefs constitute the President's cabinet. It was organized in 1849. At its head is the Secretary of the Interior, whose salary is $12,000, and associated with him are two assistant secretaries whose salaries are $5000 and $4500 respectively. The scope of this department is wide and diversified. It has supervision of Indian affairs; of the public lands, including mines; of pensions; of patents; of the census, when directed by law; of the geological survey; of education; of the custody and distribution of public documents; of railroads which have received subsidies from the United States; of the Territories; of national parks and reservations; of certain charitable and penal institutions in the District of Columbia; of the returns office in which are filed returns of contracts made by the Secretary of War, the Secretary of the Navy, and the Secretary of the Interior, and of some other miscellaneous business. Most of the bureaus into which the department is divided are presided over by commissioners, appointed by the President by and with the advice of the Senate; but the Secretary's office is the great clearing house of the department, and the various commissioners are subject to the Secretary's directions in the performance of their executive duties.

INTERIOR BALLIS'TICS. See BALLISTICS.

INTERIOR DECORA'TION. The art of decorating and furnishing the interiors of a building, especially the important rooms of a residence. The purpose of the present article is to supply the historic and decorative background likely to be of special service to those who buy, install, or make furniture, rugs, wall paper, draperies, lamps, etc. The styles treated are: Gothic, Renaissance, Elizabethan, Jacobean, Louis XIV, Louis XV, Louis XVI, Empire, Charles II, William and Mary, Queen Anne, Georgian, and Adam. For the other historic styles, see ARCHITECTURE; FURNITURE.

Classic v. Romantic. In the world of decorative art, as in the world of literature, two principles strive for mastery, the classic and the romantic. The soul of the classic is balance and proportion and perfection of form; of the romantic, enthusiasm, mystery, and life. The former is exquisitely measured; the latter is beyond measurement. The most perfect of the classic styles is Greek; the greatest of the romantic styles is Gothic. Other classic styles are Egyptian, the mother of Greek; Roman, the daughter of Greek; and Renaissance, the granddaughter. Other styles properly classed as romantic are Persian, Chinese, Japanese, and Art Nouveau. Byzantine, Romanesque, and Rococo are mixed styles, partly classic and partly romantic. This distinction between classic and romantic is vital in interior decoration. Once apprehended, it makes easy the lesser distinctions between Louis XIV and Louis XV, Elizabethan and Jacobean, Georgian and Adam.

Gothic. Of the nonclassic styles, the most important is Gothic, that in the last half of the twelfth century began to be created in northern France out of Romanesque, and that flourished in western Europe for three centuries—the thirteenth, fourteenth, and fifteenth. In Gothic the long process of transformation that had orientalized Roman into Byzantine, and out of Byzantine and Roman had developed Romanesque, was completed. Decoratively as well as architecturally Gothic is the antithesis of classic. Most of the Gothic furniture, tapestries, and other interior decorations that have been preserved, date from the fifteenth century or the first few years of the sixteenth, so that, from the decorative point of view, the Gothic of the fifteenth century, particularly that of the territory controlled by the dukes of Burgundy—not only the Duchy of Burgundy in east central France, but also and especially the Netherlands and a strip of northern France including such prosperous cities as Arras and Lille—is of prime significance. The Burgundian court was the richest and most fashionable in Europe. For Philip the Good (1419–67) and his son Charles the Bold (1467–77) were made by their own subjects the richest costumes, the finest furniture, the most beautiful tapestries, the most brilliant paintings, and the most exquisite illuminated manuscripts. The King of France they regarded as an inferior, and the King of England and the Emperor they met on equal terms. After the defeat and death of Charles the Bold, in 1477, ensued a splendid efflorescence of late Gothic and Gothic-Renaissance decorative arts in Flanders and the rest of the Netherlands under the suzerainty of the Emperor, and in France under Charles VIII (1483–98) and Louis XII (1498–1515). During this period were woven at Brussels the Mazarin tapestry now in the New York Metropolitan Museum, and the numerous similar pieces in the Royal Spanish collection. (See TAPESTRY.) The museums that best illustrate Gothic interior decoration are the Cluny and the Louvre (Musée des Arts Décoratifs) in Paris, the Victoria and Albert in London, the Metropolitan in New York, the Kunstgewerbe in Berlin, the Bavarian National in Munich, the Germanisches at Nuremberg, the National at Copenhagen, the Cinquantenaire at Brussels, the Rijks at Amsterdam, the Steen at Antwerp, the Trimolet at Dijon.

Of a Burgundian banquet hall, 140 feet long by 70 wide and 60 high, built to celebrate the marriage of Charles the Bold to Margaret of York in 1468, Olivier de la Marche has left us a most picturesque contemporary account. He says: "In this hall were three tables, one of which was placed across the ends of the others. This table, higher than the others, stood upon a platform. The other two tables were placed on the two sides of the hall, occupying the whole length; they were very long and very handsome, and in the centre of the said hall a high and rich buffet in the form of a lozenge was placed. The top of the said buffet was inclosed with a balustrade, and the whole was covered with tapestries and hung with the arms of Monsieur le Duc; and above rose the steps and degrees on which were displayed many vessels, the largest on the lowest, and the richest and smallest on the top shelves; that is to say, on the lowest shelves stood the silver-gilt vessels, and above them the vessels of gold garnished with precious stones, of which he had a great number. On the top of the buffet stood a rich jeweled cup, and on each of the four corners large and entire unicorn's horns. . . . These vessels of parade were not to be used, for there were other vessels, pots and cups intended for service."

Of a Burgundian bedchamber, that of Isabella, first wife of Charles the Bold while he was still only Count of Charolais, Aliénor of Poitiers, whose mother was maid of honor to the third wife of Philip the Good, gives us an account. She says that it was very large and contained two beds, about 5 feet apart, beneath a canopy of green damask, from which hung curtains of satin that could be drawn to completely screen the beds when desired. The curtains and the lambrequin of the canopy had a green silk fringe. On each bed was an ermine counterpane, with very fine violet lining. The show feature of the room was the *dresser*, "of four beautiful shelves, filled with vessels of crystal garnished with gold and precious stones, and some of fine gold." In the corner near the dresser was a little low table containing the cups and saucers in which something to drink was served to callers after they had been offered a dragée from the drageoir or bonbonnière that stood on the dresser.

Gothic is the antithesis of classic. In Gothic the vertical is accentuated at the expense of the horizontal, the number of spire shapes and nearly perpendicular lines being vastly increased, while the number of horizontal lines and bands like those of the classic entablature is diminished, and the effect of those that remain is weakened by breaking them. This is what gives Gothic furniture as well as Gothic cathedrals and stained-glass windows such an uplifting effect—an effect that is much closer to nature than that of Greek and Roman, and that even suggests the lines and shapes of some of the more symmetrical lofty caves and mountains and trees produced by nature. Gothic columns are totally unlike classic columns, being far slenderer—attenuated by comparison—so that the vertical impression they give is extreme, whether they stand singly or grouped in piers. Their capitals are not the classic ones, but have necks of oak leaves and other domestic foliage—sometimes supplemented by quaint animal or human heads at the corners—naturalistically carved, with a slender molding below, and a round, square, or polygonal cap above, formed of an expanding series of moldings. These moldings as well as those on the bases are exceedingly decorative, but totally unlike the classic ones, being much sharper and slenderer. The most obvious feature of Gothic is the pointed arches that not only frame gables and the tops of doors and windows, but repeat themselves over and over again, combined with columns and circles and trefoils and quatrefoils, in the tracery work of stained-glass windows. Duplicating the outlines of this tracery work, perhaps borrowed from it, are the carvings, sometimes pierced, that adorn the panels of furniture and other woodwork. Based upon this ornament and developed in sympathy with it, are the patterns of Gothic damasks and brocades and embroideries, while slender and fancifully jeweled columns and arches are often used to divide and subdivide the different scenes of picture tapestries. So that between Gothic architecture and the other decorative arts of Gothic there is a peculiar sympathy, despite the fact that all the ornament of Gothic tapestries and embroideries and decorative painting, and most of that of Gothic stained-glass windows, is absolutely flat, without shadows to force forms into realistic relief. This fact is, of course, closely associated with the tiny scale of Gothic decoration, details being minute and infinite in number, but all adequately portrayed. The attempt to show them in high relief would have obscured them by the blackness of the shadows, making it necessary to work on a larger scale, as was illustrated later in the development of Baroque.

Renaissance. Renaissance was the rebirth of classic—a reaction from the then modern to ancient, from Gothic to Roman. Banished was the lofty and aspiring perpendicularity of pointed arches, and restored was the horizontal solidarity of round arches and low pediments, of heavy entablatures and square lintels. Once more flourished Doric and Ionic and Corinthian capitals and columns and pilasters, together with ornamental shapes like the egg and dart, the bead and fillet, the Greek fret, the anthemion, and the acanthus leaf in its numerous developments—all employed to enrich interiors as well as exteriors.

The home of the Renaissance was Italy. In Italy the Renaissance of the classic decorative arts began a century earlier than in France, the Netherlands, England, Germany, and Spain. In the latter countries it was of the sixteenth century only and much mixed with survivals of Gothic, Romanesque, or Moorish. In Italy it was of the fifteenth century as well as of the sixteenth. Not difficult was it for the Italians to discard Gothic that they had never completely assimilated. Easy and natural it was for them to revive the style of their ancestors, actual examples of whose architecture they saw all around them, and actual examples as well as illustrations of whose interiors they found in buried palaces, like the Golden House of Nero, which at the beginning of the sixteenth century taught so much to Raphael and his pupils—chief among them Giulio Romano, some of whose designs for tapestries illustrate so brilliantly the Grotesque ornament of ancient Rome. The great names of the Italian Renaissance are Brunelleschi, Alberti, and Bramante of the fifteenth century, Palladio and Vignola of the sixteenth. Alberti achieved fame, not only by his buildings, but also by the posthumous publication of the first *printed* book on architecture, accompanied by illustrations and based on Vitruvius, the Roman architect of the time of Augustus, a manuscript copy of whose *De re ædificatoria* had been discovered a few years before. It was one of a long series of such books, the best known of which are those by Palladio and Vignola, which for centuries served to guide youthful students towards the shrine of classic art. Alberti's book was in Latin, the latter two in Italian. The invention of printing in 1453 had a profound and far-reaching effect upon Renaissance art, both decorative and pictorial. It enabled forms and figures originated in sculpture, wood carving, painting, fresco, stained glass, and tapestry to be spread broadcast inexpensively on paper. In other words, it popularized knowledge about art at the expense of knowledge of art and tended to substitute book knowledge for first-hand knowledge. But the immediate result was brilliant, for it brought book knowledge to those already equipped with knowledge practical and concrete, so that of all the periods in decorative art the richest in many respects is that 50 years before and after 1500.

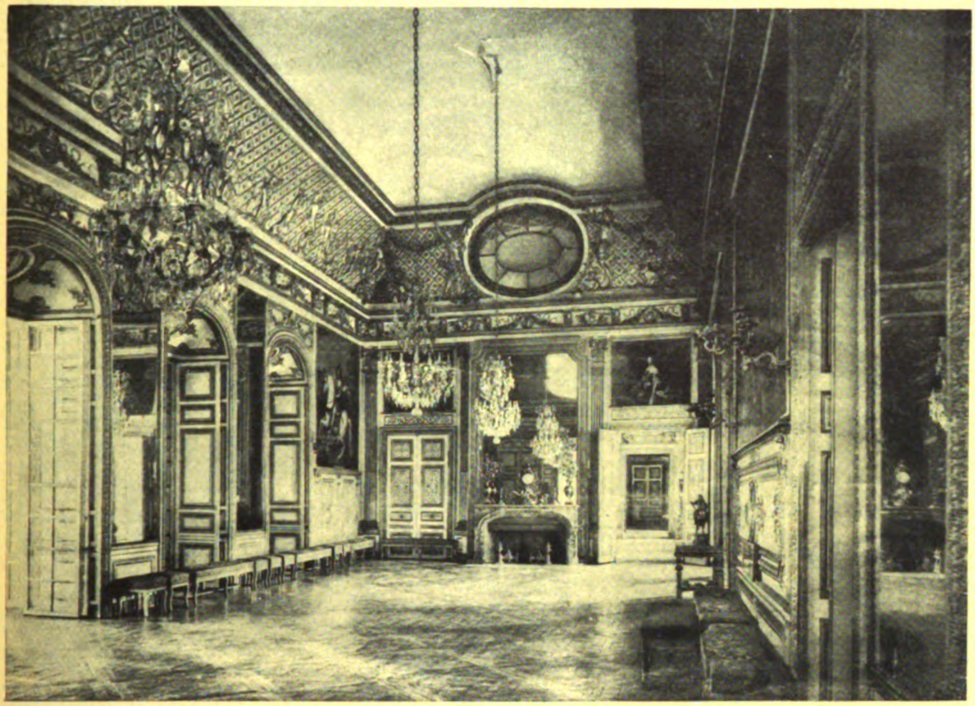
Elizabethan. The Elizabethan style (1558–1603) is not a simple style. It is a style for show rather than for comfort. Elizabethan mansions were planned for the purpose of displaying to the world the wealth and culture of English landed proprietors. Nor is the Elizabethan style a pure style. There are many traces of Gothic, and the Renaissance part is by no means of the purest Italian type. Nevertheless, of all the English styles, it is in many respects the most interesting. Like Elizabethan literature, it is so full of affectations as to seem natural because so frankly parading them. Like Shakespeare, it borrowed materials from every available source, transforming them into vivid and spirited though seldom altogether classic works of art. During the reign of Elizabeth's father, Henry VIII (1509–47), there had been no real amalgamation of Renaissance with English Gothic. The new Renaissance mausoleums and other buildings produced in England were designed and erected by imported Italian artists and artisans. But when Elizabeth ascended the throne, all this was changed. English workmen learned to execute the details of the fashionable imported style. English architects, trained by travel in Italy and France and by study of engraved plates and illustrated books, learned to supply home-made plans for English Renaissance residences. What contrasted Elizabethan Renaissance with continental Renaissance and particularly with Italian Renaissance, was the English Gothic that survived as part of it. The general arrangement of houses remained English, with the spacious and often stately hall as the main apartment. But the elaboration of the other rooms was on a scale far more magnificent than before. A point to be especially noted is that Elizabethan mansions were not fortified castles but peaceful country houses. The settled conditions of life during the reign of Henry VIII had rendered fortification no longer necessary. And the suppression of the monasteries had turned all the building resources of the kingdom into the creation of homes for noble families, so that on domestic architecture and decoration was spent the money that previously had gone to construct and equip churches and convents. A prominent feature of Elizabethan mansions is the windows mullioned in the Gothic fashion with small panes of clear or stained glass, and with square instead of pointed top, sometimes filling the whole façade, as at Hardwicke Hall. Another prominent feature is the fireplaces—prominent for service as well as decoratively—framed elaborately and with elaborate overmantels of stone or wood. Here the influence of German and Flemish books of design made itself felt in ornate strapwork and coats of arms, and in statuettes of the Virtues or Scientia or Arithmetica or Geometria. An especially interesting Elizabethan chimneypiece is the one found in the hall of "Losely," a mansion near Guildford, begun by Sir W. More in 1562, completed by his son 50 years later, and several times honored by the visits of royalty. The ceilings of an Elizabethan residence were apt to be elaborately patterned in plaster, and the walls paneled in oak or hung with tapestry. In the ceiling patterns as well as in the mullioned windows the Gothic feeling is often strong, whether the designs are executed in ribbed or strap work. Floors were simply treated, usually strewn with rushes, with perhaps one rug in the main hall and another in the main parlor or "withdrawing room," for the use of the master. Windows and doors and the huge four-poster beds were elaborately draped sometimes with tapestries, but more often with embroideries in silk or linen, in elaborate floral and grotesque patterns. Heavy imported velvets and damasks and brocades were also used; and for upholstery, leather embossed in the Spanish fashion.

Jacobean. If the English during the seventeenth century had not been so busy dethroning the Stuarts and bringing them back again, or, in other words, if the full development of a Charles I style had not been obstructed by Parliament, London instead of Paris might have become the decorative capital of the civilized world, and Charles instead of Louis might be the supreme name in the history of decorative art. As it is, Jacobean is a convenient term under which to group the styles of James I (1603–25) and Charles I (1625–49), the corresponding French period being that of Louis XIII. How ambitious James and Charles, inspired by Buckingham, were to surpass the example of the French King Henri IV in encouraging the art industries, is shown by the establishment of the Mortlake tapestry works in 1619, and especially by the tapestries woven there for Charles I with a Latin inscription in the bottom border that says, "Kings foster the arts." (See TAPESTRY.) Cromwell and the Commonwealth not only ended the prosperity of the tapestry works, but also dealt another severe blow to the decorative arts when they dispersed the "household goods, jewels, plate, etc., belonging to the late King." These were sold "by order of the Councill of State, from ye severall Places and Palaces." The tapestries, both antique and modern, were especially noteworthy, and helped greatly to enrich the French, Swedish, and other continental collections. While late Elizabethan and early Jacobean are hard to distinguish, so that Jacobean furniture and interiors have often been described and sold as Elizabethan, between the periods as a whole the line of demarcation is definite. During the Jacobean period the last vestiges of Gothic disappear, and the victory of the foreign style is complete. Under the leadership of Inigo Jones and others who visited Italy in order to study the ancient buildings and familiarize themselves with the most approved examples of modern Italian work, all the freedom of Elizabethan invention disappeared. The instructions given in the famous book of the Italian Palladio were followed in England much more strictly than he followed them himself. Columns and pilasters and other classic ornaments began to be used less fancifully and with scrupulous adherence to what was regarded as

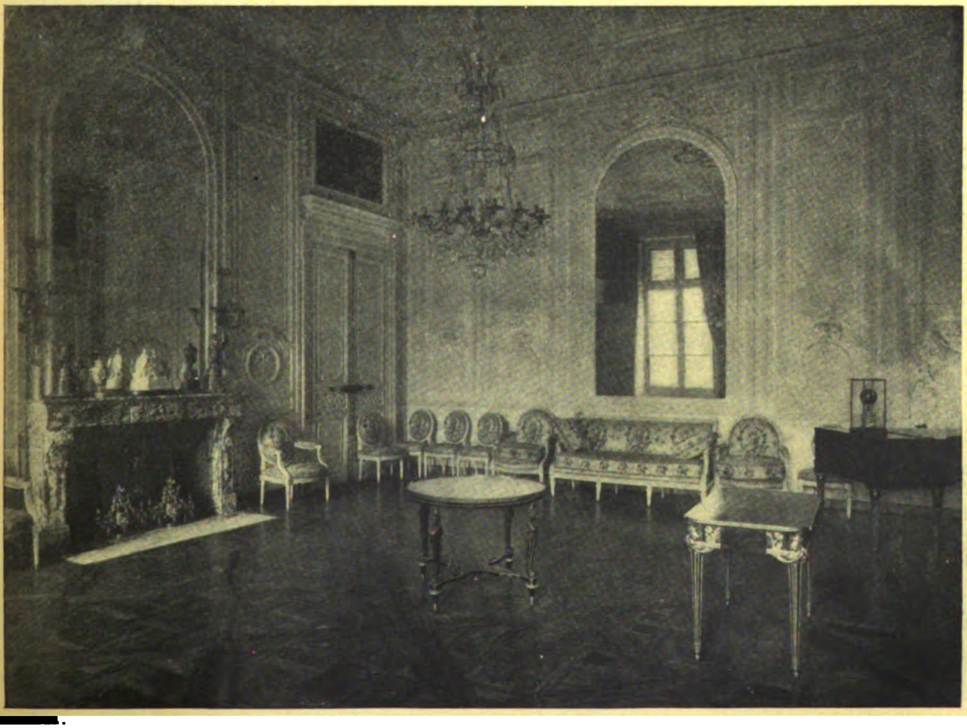
Greek and Roman precedent. The best examples of Jacobean interior decoration are those at Knole, near Sevenoaks, 21 miles southeast of London. Outside and inside this baronial mansion has changed little since the time when James I was entertained there, sleeping in the bedroom specially prepared for him by Richard, then Earl of Dorset, at a cost of $40,000. Illustrations of the principal rooms of Knole are given by Nash in his *Mansions of England in the Olden Time*, and some of the ancient tapestries are now on exhibition at the Metropolitan Museum in New York, lent by Mr. J. P. Morgan, whose father acquired them from the present owner of the estate in 1912. Particularly interesting at Knole is the "Spangled Bedroom," because the furnishings of it were the gift of James I, presumably in recognition of the hospitality shown him. The plaster and woodwork ornamentations of it are strikingly simple and classic as compared with Elizabethan, but what was saved in modeling and carving was more than made up for by the richness of upholstery and draperies. The posts of the bed are slender and simple, and in the age of Elizabeth they would have been massive and richly carved; but they are concealed by elaborate draperies. On chairs and stools upholstery replaces carving. There is a large rug on the floor, the walls are crowded with tapestries, and both windows and doors are heavily draped.

Louis XIV. During the reign of Louis XIV Paris became the decorative capital of the civilized world and the style of Louis XIV was imitated not only in Flanders and England, but also in Germany, Italy, and Spain. Earnestly, but not always faithfully, were copied the furniture and fabrics originated at the Gobelins and displayed at Versailles. The style of Louis XIV is a finished style. It has the completeness one would expect from a style developed under the influence of a powerful monarch who sought to dominate every field of artistic activity and whose reign lasted for 72 years, from 1643 to 1715. To be sure, at the beginning, during the minority of Louis XIV and the premiership of Mazarin, there was a period of transition from the style of Louis XIII; and at the end, during the old age of Louis XIV, there was a period of transition towards the Rococo of the Régime and of Louis XV; but the reign of Louis XIV was long enough to provide for these transitional periods, and at the same time to develop in the middle during the years when the Gobelins flourished under the direction of Charles Lebrun, one of the most interesting and adequate styles of decorative art the world has ever known. The style of Louis XIV is not a simple style and not a primitive style. It is not suited to country houses or modern cottages and city apartments; but it is suited to palatial city residences and to public buildings, when applied with due regard for changes of environment and condition. The style of Louis XIV is a classic style, but it is the Baroque classicism of the seventeenth century, not the Renaissance classicism of the sixteenth century. It is a magnificent style, solid and symmetrical, luxurious with gold, and, above all, dignified, but overloaded with ornament, especially ornament in relief, and often confusing with its variety of broken lines and curves. During this period the Gobelins was the centre of decorative activity. Here were designed and made furniture, tapestries, bronzes, mosaics, gold and silver ware for the King and the King's friends. Here in the month of "September, 1667, in the buildings of the Gobelins," according to the inscription at the entrance, "was established the Furniture Factory of the Crown under the direction of Charles Lebrun." The home of the Louis XIV style is the palace of Versailles, now a national museum, but not a museum in the ordinary sense of the word. It is not a haphazard collection of objects unsympathetically arranged in an unsuitable building. Versailles is Louis XIV himself incarnate in the decorative forms that expressed his personality and that of his artists and artisans. The Louis XV rooms there merely accentuate the grandeur of "the Sun King." Intimate and exquisite as they are, they seem like the refuges of diminished descendants seeking shelter from the glory of an ancestor whose too brilliant destinies it was their duty to attempt to sustain. It was in 1663 that Louis XIV began to visit Versailles frequently, deserting for it Saint-Germain-en-Laye, where he was born, which had been a favorite resort of the French kings since the twelfth century. Finding too small the palace built at Versailles by Louis XIII, i.e., the central part of the present palace, he decided in 1668 to enlarge it. The principal architect was Mansart, and the decorations were by Lebrun, who in gold and bronze and marble and stone enshrined the allegories of Victory and Empire, Europe conquered and the nations enchained, and crowded the heavy and tumultuous ceilings with Apollos and Alexanders, whose features are those of Louis XIV, advancing in triumph among terrified mortals and respectful divinities. One of the most interesting rooms at Versailles is the bedchamber of Louis XIV, which for many years was the centre of society and government in France. Here he held his great audiences and received the remonstrance of the Parliament. Here, on Sept. 1, 1715, he died, and in this bed his body was exposed to view after death.

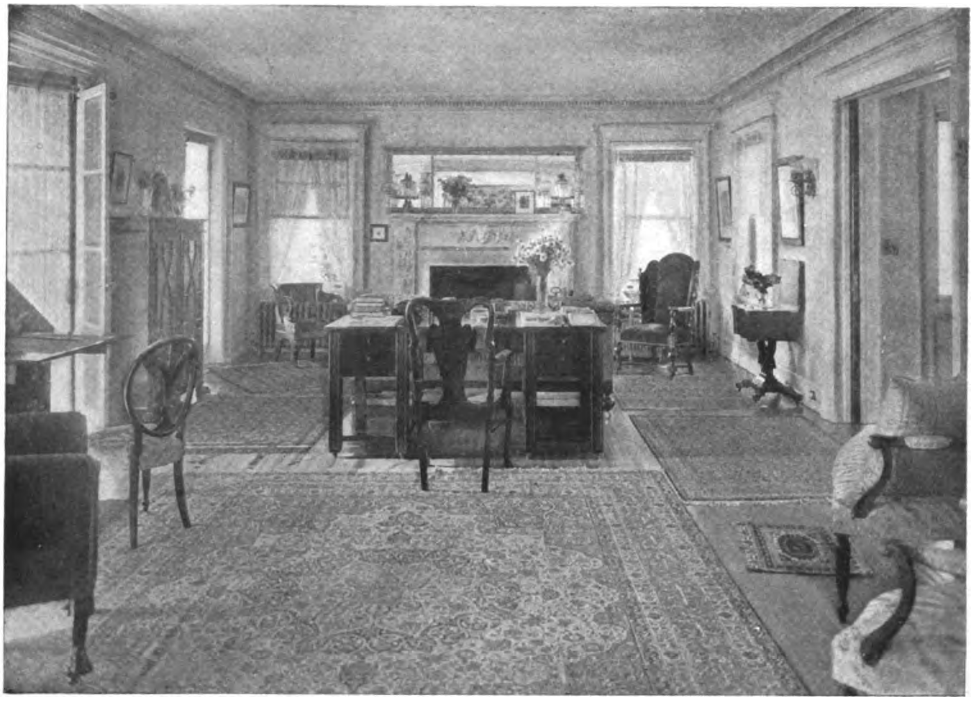
Louis XV. Of the three great Louis styles, that of Louis XV is as much distinguished for *originality* as that of Louis XIV for *grandeur*, and that of Louis XVI for *simplicity*. The style of Louis XV was to some extent an *art nouveau*, or *new art* style. It represents a definite attempt to break away from tradition and, while retaining French Renaissance architecture, to adorn it with original decorative forms adapted and developed from rocks and shells and trees and plants. From this introduction of rock and shell motifs, *rocaille* and *coquille* in French, came the nickname of Rococo applied to the style of Louis XV. While the style of Louis XIV had eliminated Italian Renaissance feeling in French furniture and decorations, much that was ancient Roman still remained. In Louis XIV ornament the figures were Roman figures nude or clad in Roman draperies, and the characters were derived from Roman mythology. When Louis XIV or members of his family or court were introduced, it was in the guise of Roman gods and heroes. From the Watteau grotesques of the Régence, the term often applied to the style of the minority of Louis XV (1715-23) when Philippe of Orléans was Regent of France, the Roman tradition has entirely departed. The figures are avowedly French, clad in contemporary French costumes, and the buildings resemble those of the French court. The



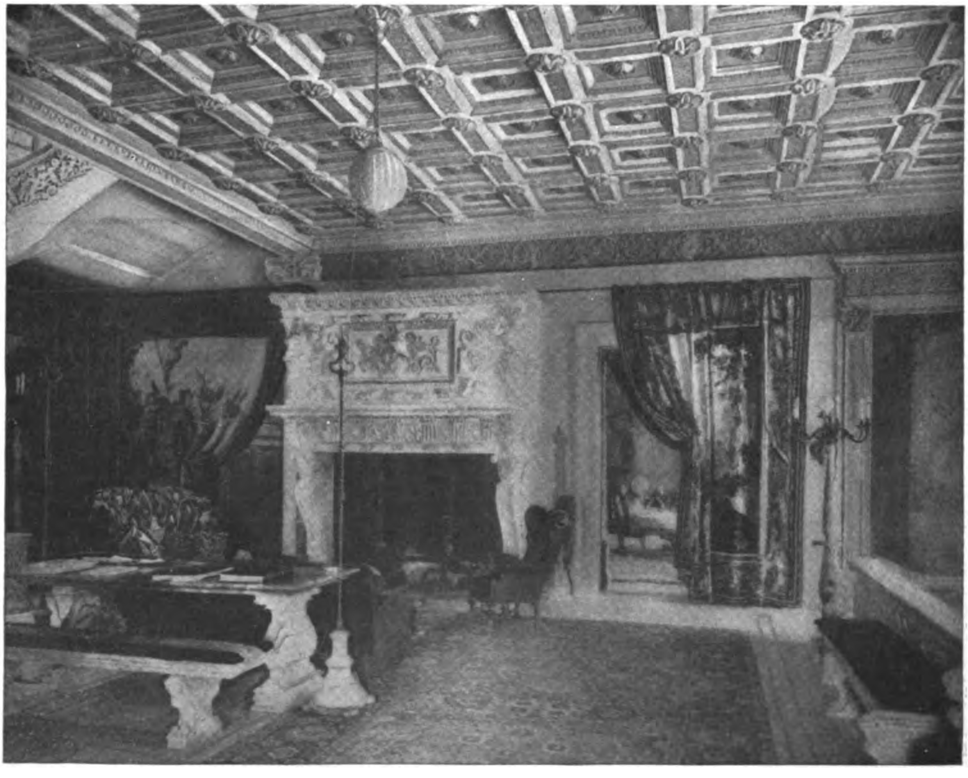
BULL'S EYE SALON IN THE PALACE OF VERSAILLES.
A PERFECT ANCIENT EXAMPLE OF THE STYLE OF LOUIS XIV.



RECEPTION ROOM OF THE PETIT TRIANON AT VERSAILLES.
A PERFECT ANCIENT EXAMPLE OF THE STYLE OF LOUIS XVI.



COLONIAL LIVING ROOM IN A SUBURBAN HOUSE NEAR NEW YORK.
THE FURNISHINGS ARE ALL MODERN.



ITALIAN RENAISSANCE HALL IN THE WHITNEY RESIDENCE, NEW YORK CITY.
DESIGNED AND EXECUTED BY THE LATE STANFORD WHITE. MOST OF THE FURNISHINGS ARE ANCIENT.

most obvious characteristic and the one that enables the novice most quickly to distinguish the style of Louis XV from that of Louis XIV is *lack of symmetry*. In the patterns of Louis XIV the right side is a replica of the left side, and a vertical median divides them symmetrically into equal halves. But in the patterns of Louis XV the sides are often totally unlike and do not correspond or repeat. Cartouches and shields often have the main axis in an oblique position. Another noteworthy characteristic of the style of Louis XV is *dread of the straight line*. Profiles bend into S's, and everything twists and undulates. Flat surfaces are replaced by surfaces bombé, or bulbous. The foremost designer in the Rococo style was Jules Aurèle Meissonier, who is described on the title-page of his book of furniture and decorative designs as "painter, sculptor, architect, and designer of the King's Chamber and Cabinet." Meissonier also published a book on plants and vegetables as furnishing material for the designer, thus indicating clearly enough the back-to-nature tendencies of himself and his school. In the reign of Louis XV the romantic spirit dominated life and art alike. Woman was supreme. Her smiles and frowns decided matters of state, and the lords of the council chamber trembled before the ladies of the boudoir. For their comfort or to please their fancy, rooms were made smaller and more homelike, beamed ceilings disappearing and mirrors taking the place of huge paintings and enormous bas-reliefs. Chairs and tables and stands became graceful and coquettish, even capricious. Colors as well as forms became lighter in the period of Louis XV. The gold and crimson and green of Louis XIV were succeeded by gold in combination with white and ivory and delicate tones of lilac and lemon, sky blue, rose, blue gray, etc. Draperies also became lighter, and the use of lace curtains more general.

Louis XVI. While Louis XVI did not ascend the French throne until 1774, the classic revival that bears his name was already beginning to assert itself in 1760. Indeed, one of the leaders in the movement that substituted the back-to-classic style of Louis XVI for the back-to-nature style of Louis XV, was the latter's fair friend, the Marquise de Pompadour, who sent decorative artists to Italy to study the ancient interiors and decorative treasures unearthed at Pompeii 1700 years after Vesuvius buried them. The popular phrase in decorative circles was "in the antique style," and many books were published illustrating and describing Pompeian forms and ornament, where models and designs were copied with almost slavish fidelity. The style of Louis XVI was not only a classic style; it was also a pastoral style. In 1768 Louis XVI, then Dauphin, was pictured at the plow. Political economists preached the land as the source of all wealth; writers turned out idyllic stories like *Paul and Virginia* and the *Nouvelle Héloise;* decorators substituted fruit, flowers, and vegetables for the rocks and shells of Rococo. The style of Louis XVI is, above all, a gentle style. From it is banished all violence of line, shape, and color. The subjects of the tapestries, medallions, panels, bronzes, etc., are restful. There is none of the cold dignity of Louis XIV, none of the saucy affectation of Louis XV. Especially soothing are the colors, with their subdued grays and lack of brilliancy. The style is also essentially flat. There are none of the bold reliefs so common in the form of cornices, moldings, pediments, and furniture carvings in the days of Louis XIV. In both structure and ornament the straight line and the right angle rule. Parallelism of motifs is frequent, and rectangular panels are apt to be comparatively narrow. In small objects and for frames the oval is common. Besides pastoral forms, Louis XVI decorators loved also sentimental and allegorical forms—bows and arrows, cooing doves, and torches. Especially characteristic is the bow of ribbon applied to the top of panels and medallions, with ends floating down on each side. The style of Louis XVI is distinctly more refined than that of Louis XV. There is less coarseness and less suggestiveness in the paintings and the tapestries. It also differs from the style of Louis XV and resembles that of Louis XIV in being a symmetrical style, the motifs on the left of a panel repeating themselves on the right. But while the style of Louis XIV is a grand style, that of Louis XVI is dainty and intimate—a style for the home rather than for the court, and one that can be modified in the direction of simplicity and inexpensiveness without losing character; so that, of all the French styles, it is the one best fitted for general use, and the one most used to-day in English and American residences. Famous interiors in the style of Louis XVI are the apartments of Marie Antoinette in the palace at Fontainebleau and in the Petit Trianon at Versailles. The numerous vases and cameos used in the ornament of the former make clear why the Germans call this the *Zopfstil* (vase style) and indicate the close relationship between it and the contemporary English style of Adam, with its Wedgwood vases and plaques.

Charles II, William and Mary, Queen Anne. When Charles II (1660–85) returned to England after his long exile in France, he brought back with him French manners and tastes, and during the next half century the style of Louis XIV was dominant at the court and in the royal palaces of England and was followed or imitated by most of the English nobility. The surroundings of Charles II were luxurious to a degree previously unknown in England, and the establishments of his fair friends (Castlemaine and Portsmouth and Mazarin), made duchesses by him, were among the sights of London, very quickly swallowing up the £60,000 a year that he received from Louis XIV. The diarist Evelyn was particularly moved by the solid silver furniture in the apartments of the Duchess of Portsmouth—a Frenchwoman, Louise de Kérouaille in the pay of Louis XIV—and by the new French tapestries (Gobelins) which he naïvely describes as "incomparable imitations of the best paintings—Versailles, Saint-Germains, and other palaces of the French King, with hunting figures, landscapes, and exotic fowls, all to the life ready done." Nell Gwyn had a silver bedstead with embossed representations of the King's head, slaves, eagles, crowns, cupids, and Jacob Hall the tight-rope dancer. The King's head weighed 197 ounces, and the other ornaments 2168 ounces, costing altogether £906. Latham, in his *English Homes*, illustrates several pieces of silver furniture still preserved at Knole.

The quieter courts of James II (1685–88) and of William and Mary (1689–1702) encouraged simpler and more practical furnishings, and of course during the reign of the latter the Dutch influence was strong, and importations from Holland were many. Much of the luxury that Charles II had loved was destroyed by the burning of Whitehall Palace in 1698, with its 1000 elegantly furnished apartments. The most prominent architect of the period was Sir Christopher Wren (1632–1723), who rebuilt a large part of London after the great fire of 1666. He never visited Italy, but was in Paris in 1665, returning thence, as he himself said, with "All France on paper." While in Paris he met the great Italian Baroque architect Bernini, who gave him a glimpse only of designs he was then making for the façade of the Louvre, and which Wren said he would have "given his skin" for a chance to copy. Upon the accession of William and Mary, Wren was commissioned with the enlargement of Hampton Court Palace and constructed the existing suite of state apartments in avowed imitation of the splendor of Versailles. One of the most important rooms at Hampton Court is the bedchamber of Queen Anne (1702–14), with elaborate four-poster bed in crimson Genoa velvet, and walnut chairs, benches and stools to match, all very good Louis XIV in style. The mural paintings by the Italian Verrio in Queen Anne's drawing room are each 20 by 35 feet, and, being overhung with green damask in 1735, were only brought to light again in 1899. They picture Queen Anne and Prince George in allegorical scenes, with Europe, Asia, Africa, and America come to offer homage. The most famous residence built in the reign of Queen Anne is Blenheim, tribute of the English nation to the Duke of Marlborough for his great victory over the French at Blenheim. It cost over half a million pounds, and the three state rooms with their tapestries picturing the Duke's victories, all in the style of Louis XIV, with furniture to match, are particularly imposing.

Georgian. During the reigns of George I (1714–27) and George II (1727–60) French decorative styles continued to be copied in England, and in both countries we find the same tendency to make decorations romantic, while keeping architecture classic. Especially in England the romantic movement was violently opposed by leading architects who had studied in Rome and drew their inspiration, not from Sir Christopher Wren and France, but from Inigo Jones and Italy. Indeed, it was from Inigo Jones that they derived the massive mantelpieces in wood and plaster that are so characteristic of the early part of the Georgian period. Massive and elaborate also was the woodwork framing doors and windows and paneling walls. But it was commonly painted in cream and in light tints of blue and green instead of being left in the natural, as in the seventeenth century. The great name of the period is that of William Kent (1684–1748), whose taste was regarded as second to none, and who, as Walpole remarks, "was not only consulted for furniture, frames of pictures, glass, tables, chairs, etc., but for plate, for a barge, and for a cradle," and even for gowns. One lady he accordingly dressed in a petticoat decorated with columns of the five orders. But while Kent was designing houses, furniture, decorations, and costumes in the classic style, the romantic spirit was abroad in the land. Langley in 1742 published a book on Gothic decoration and ornament, and a little later persuaded Walpole to let him build him a Gothic residence on Strawberry Hill. Edwards and Darley published their book of Chinese designs in 1754, while Langley, Johnson, Ince and Mayhew, Halfpenny, Manwaring, and others saw to it that Rococo was not neglected. So that Isaac Ware, in his book on *Classic Architecture* published in 1756, wrote: "His own misfortune to see at this time an unmeaning scrawl of C's inverted, turned and hooked together, take the place of Greek and Roman elegance, even in our most expensive decorations. This is not because the possessor thinks there is, or can be, elegance in such fond, weak, ill-jointed, and unmeaning figures; it is usually because it is French; and fashion commands that whatever is French is to be admired as fine." Elsewhere in the same book Ware laments that "paper has taken the place of sculpture"—by paper meaning wall paper; and by sculpture, columns and pilasters and pediments and moldings in wood and plaster. Wall paper began to be commonly used in England about this time and must have aroused Ware's wrath, not only because it displaced wood and plaster, reducing the frames of doors and windows to simple casings, and minimizing or eliminating chimney-pieces, but also because it is of Chinese origin and because a large proportion of the early French and English papers have designs that were Chinese (more or less) in character, or Chinese and Rococo mixed. (See WALL PAPER.) Just as in France under Louis XV, so in England rooms became smaller, and pieces of furniture more numerous and more comfortable. Now there began to be chairs for all, and interiors not only looked less like Roman temples but felt less like them—which explains why the Georgian period was so distinctly an age of chairs and affords so appropriate a background for Thomas Chippendale (q.v.).

Adam. Not without reason has the name Adam become attached to the English classic revival contemporary with Louis XVI, for in interior decoration as well as in architecture the influence of Robert Adam was preëminent. Though Hepplewhite and Sheraton (q.v.) justly acquired fame as furniture designers, as far as style is concerned, they were followers rather than leaders, and were only too glad to model their chairs and other furniture to conform with the prevailing classic style. The common fault of the English classic interiors that preceded the Adam period was *ponderousness*. As Robert Adam himself says in the preface to the *Works on Architecture of Robert and James Adam*, published from 1773 to 1779, with a posthumous supplement in 1823, Robert Adam having died in 1792 and James Adam in 1794: "In place of the massive entablature, the ponderous compartment ceiling, the tabernacle frame, almost the only species of ornament formerly known in this country, we have adopted a beautiful variety of light moldings, gracefully formed, delicately enriched, and arranged with propriety and skill. We have introduced a great diversity of ceilings, friezes, and decorated pilasters and have added grace and beauty to the whole by a mixture of grotesque stucco and painted ornaments, together with flowery *rainceau* (rinceau) with its fanciful figures and winding foliage." The previous ponderousness, Adam goes on to explain, was due to the first masters of the Italian Renaissance, who applied to residences massive ornament copied from Roman temples and other public buildings. In consequence of their mistake "all Europe has been misled and has been servilely groaning under the load for three centuries past." The Romans themselves, wrote Adam, were extremely careful as to proportion, and the decorations of their private apartments were "all delicacy, gayety, grace, and beauty." A lesser example of what Adam means are the famous Boncereale frescoes in the New York Metropolitan Museum. An important factor in the development of the Adam style was the secret of making compo ornament, which, together with workmen who understood the process, Robert Adam brought back from Italy. This compo, cast in various patterns in wooden molds and then applied to ceiling or wall, was much cheaper than wood carving or plaster work executed in position, and, for delicate ornament in the Adam style, much better. An individual note in the Adam style was the introduction of ornament copied from the vases and urns of the ancient Etruscans. Robert Adam also got fresh material from Diocletian's vast palace at Spalatro in Dalmatia, of which he was the first to make drawings, published as a folio volume in 1764. The book above all others from which to get an accurate knowledge of the Adam style is the *Works on Architecture*, mentioned above, that presents superb copperplate engravings not only of the exteriors but also of the interiors and the decorations of famous residences planned and executed by Robert Adam.

Contemporary American Decoration. Towards the close of the nineteenth century the French styles of Louis XIV, Louis XV, and Louis XVI were the fashion in the United States. The highest ambition of the decorative salesman was to be able to point out to customers the distinguishing marks of the three periods. As the years rolled on, and French and English decorators, as well as American decorators with French training, began to execute French interiors worthy of the name, there began to be a revival of interest in Old American furniture and furnishings, under the name Colonial. Naturally the first attempts at reproduction were crude, and many of the Colonial rooms composed of antiques or bad reproductions were confused in style and unsatisfactory in taste. By degrees, however, as Colonial furniture began to be assembled in intelligent collections by individuals and societies, furniture makers displayed more interest and more skill in the copying of fine models, and decorators made groupings that were harmonious. Of course, the study of Colonial soon led across the water to England, where most of it originated, and before long English and American decorators were creating Jacobean, Queen Anne, Georgian, and Adam interiors for American patrons. Gradually the French styles were eliminated entirely from merchandise shops, surviving only in the city homes of the very wealthy, mostly those who are willing to pay the price for antique French furniture and tapestries. In large American country homes we now find mainly Colonial and English interiors, with some of the more magnificent apartments in the style of the Italian Renaissance, and an occasional hall or living room Gothic or Gothic-Renaissance transition. A large percentage of the furniture is reproduced with considerable fidelity from excellent antique pieces, and a small percentage is genuinely antique. Around important old tapestries or pieces of furniture rooms are often built, all the other furnishings being planned to harmonize in style and scale.

Some of the best interiors are executed by the architects who have given attention to the art of interior decoration, but there are also men and women of different degrees of training and taste who are engaged in this work, and, as is perhaps natural, the jealousies among interior decorators of various classes or groups are bitter. The interests of the *merchandise house*, whether department store or furniture and carpet store, are constantly opposed to the interests of the decorative shop that devotes itself exclusively to *fine work*, while both are annoyed by the *upholsterer decorator* doing business on a small scale, and by the so-called *consulting decorator* without a shop. The most hopeful sign for peace among the warring elements, as they are found in New York, is the continued existence of the Art in Trades Club, organized in April, 1906, by graduates of Frank Alvah Parsons's classes in interior decoration, consisting of men in the decorative trades. The objects of the club are: "To bring into association men engaged in, or interested in the Arts and Art Trades, for mutual advancement and study; to study the principles of Art as applied to Trades connected with the decoration and furnishing of buildings; to harmonize commercial activities with the growing Art tendencies of the present time; to foster feeling and taste for Art expression in general; and to strengthen the natural bond between those thus allied by fellowship and a community of interests."

The increasing number of amateur decorators, with a brief training at some art or decorative school, causes considerable perturbation in the trade, especially among those who have been insufficiently educated, having "grown up in the business," without any special knowledge of art and of æsthetic theory. But the effect of this irruption into trade circles is decidedly uplifting and has raised the standards of culture and taste appreciably among decorative salesmen. Not the least important result of the work done by schools and universities along decorative lines is the development of a public whose knowledge compels increased knowledge on the part of the trade and promotes good taste even in the cheapest shops. Helpful in the same direction is the installation of well but very inexpensively furnished apartments of two or three rooms in some of the public schools, as well as of "period rooms" and "model houses" in many of the large merchandise shops.

Bibliography. Robert Adam, *Works in Architecture of Robert and James Adam* (London, 1773–1822); J. Nash, *Mansions of England in the Olden Time* (4th series, ib., 1839–49); James Ward, *Historic Ornament* (2 vols., ib., 1897); August Man, *Pompeii: Its Life and Art* (New York, 1904); Richard Glazier, *Historic Ornament* (ib., 1906); Alexander Speltz, *Styles of Ornament* (Berlin, 1908); Charles Latham, *In English Homes* (3 vols., London, 1909); Tipping, *English Homes, Elizabethan and Jacobean* (ib., 1912); Haencke, *Entwicklungsgeschichte der Stilarten* (Leipzig, 1913); and the numerous editions of Vitruvius, Palladio, Vignola, and

Serlio. Books on present-day furniture and furnishing are being brought out in bewildering variety; but many of the American books on decorative subjects are unworthy of serious consideration. Among exceptions to the rule are Wharton and Codman, *The Decoration of Houses* (New York, 1897); Elsie Dewolfe, *The House in Good Taste* (ib., 1913); G. L. Hunter, *Home Furnishing* (ib., 1913). Authoritative American books on special decorative subjects are G. L. Hunter, *Tapestries* (ib., 1912); L. V. Lockwood, *Colonial Furniture in America* (ib., 1913). Valuable for what is quoted rather than for the opinions expressed are Esther Singleton, *French and English Furniture* (ib., 1903); id., *Dutch and Flemish Furniture* (ib., 1907); id., *Furniture of our Forefathers* (2 vols., ib., 1913). Among American magazines that contain articles helpful to the interior decorator are *American Architect* (New York), *Architectural Record* (ib.), and *The Craftsman* (ib.). See Decorative Art; Furniture; Architecture.

IN′TERJEC′TION (Fr. *interjection*, Lat. *interjectio*, a throwing between, from *interjicere*, to throw between, from *inter*, between + *jacere*, to throw). One of the parts of speech. (See Grammar.) Interjections proper are merely emotive reflex movements of the vocal organs accompanied by voice, as *ouch, O, grrh, poo*, and many of a like nature. Sounds of this type are the most primitive of all forms of speech and are the only sort of vocal language shared by man with other animals. The present tendency of logicians is to treat the interjection as the most primitive form of judgment. The term "interjection" is often applied to vocatives and imperatives when they are employed as isolated exclamations, as *heavens, the deuce, alas, Charles, stop, go on*, and the like. The vocative interjection may be a representative of the single-membered sentence consisting of a subject only, with no predicate. This is not undisputed, however, for there certainly is in many cases, and may perhaps be in all, an ellipsis of a predicate. The imperative interjection seems to be a predicate with an ellipsis of the subject. It is to be noted that though interjections proper stand isolated and complete in themselves, both vocative and imperative interjections are frequently elliptical and, strictly speaking, equivalents for sentences, and are not real sentences, as are the true interjections. Consult: Delbrück, *Grundfragen der Sprachforschung* (Strassburg, 1901); Wundt, *Sprachgeschichte und Sprachpsychologie* (Leipzig, 1901); Mauthner, *Beiträge zu einer Kritik der Sprache* (2d ed., Stuttgart, 1906–13); Paul, *Prinzipien der Sprachgeschichte* (4th ed., Halle, 1909).

INTERLAKEN, ĭn′tẽr-lä′ken (between the lakes). A summer resort of Switzerland, in the Canton of Bern, delightfully situated, 1863 feet above sea level, on the left bank of the Aar, in the Bödeli, a plain between lakes Thun and Brienz (Map: Switzerland, B 2). The name is applied to the whole plain, which is from 5000 to 6000 feet above sea level, and includes the villages of Interlaken, Matten, and Unterseen. Its mild climate (averaging 48° F.), dry air, and magnificent mountain scenery, which includes views of the famous Jungfrau Mönch, Schwalmern, and the Bernese Alps, make Interlaken one of the most popular resorts in the Alps. It is visited annually by between 30,000 and 50,000 tourists. There are numerous good hotels, restaurants, and a Kursaal on the Höheweg—the principal avenue. The chief building is that of the old monastery, founded in 1130 and suppressed in 1528. It is now occupied by the government offices and the hospital. During the season Roman Catholic, Scottish, Anglican, and Presbyterian services are held in its ancient church. Pop. (commune), 1900, 2962; 1910, 3747.

IN′TERLIN′EA′TIONS (from ML. *interlineare*, to write between lines, from Lat. *inter*, between + *linea*, line). In a deed, will, or other legal instrument, additions or corrections, written either on the margin or between the lines. They do not invalidate or cast suspicion upon the instrument in which they appear, but there is a presumption that they were inserted after its execution and that they are not to be taken as a part thereof. This presumption may, however, be rebutted by evidence that they formed a part of the original writing at the time of its execution. See Evidence.

IN′TERLOCK′ING DIREC′TORATES. A method of insuring harmony of action between corporations in competitive relations, or in such other relations as may profitably be stabilized. By this plan, which was first employed extensively in the first decade of the twentieth century, the stockholders of one corporation elect to their directorate one or more men who serve as directors on the board of a second corporation; the stockholders of the latter reciprocate in kind. Thus, each corporation is represented in the board of control of the other by men primarily identified with its own interest. Originally this end was attained through the purchase, by those most heavily interested in one corporation, of enough stock in the other to secure the election of one or more directors. In the more highly developed form of the device such stock purchase was dispensed with. Often the representative directors held no more stock than was required to qualify them under the law for the directorate—an amount varying with the several jurisdictions from one share to five.

The device of interlocking directorates was employed extensively in the field of transportation, as a means of securing that unity of policy that could not be secured through combination or consolidation, in view of the prohibitions of the antitrust law. A more frequent object sought through this means was the securing of favorable treatment from important customers or from powerful financial agencies. Thus, the directors of the United States Steel Corporation established themselves as directors in railroad companies representing about one-half the mileage of the United States, in steamship companies, in street-railway companies, and in a large number of industrial companies consuming steel. The aggregate assets of all the companies thus interlocked amounted to over $16,000,000,000. The great financial houses made it a practice of securing representation in the directorates of other banking houses, and also in the directorates of railway and industrial companies that required their services in stock and bond flotations, etc. According to the report of the Pujo congressional committee, 18 banking houses were represented by directors or officers in at least 134 other corporations.

Popular opposition to the interlocking directorate became active about 1910. It was directed especially against the principle as employed by the banking houses. In this field the interlocking directorate was believed to constitute a gigantic money trust, controlling the flow of money and credits and thus reducing industry to a state of subjection to financial interests. The principle as employed by industrial companies was also very unfavorably regarded. It was widely believed that the only possible object to be attained by an industrial company like the Steel Corporation, through representation on boards of steel-using corporations, was a market free from competition. While persons serving as directors in two companies made it a rule not to take an active part in fixing the terms of contracts between such companies, yet it was assumed that their wishes were tacitly considered and were reflected in the terms of such contracts.

A minor evil imputed to the system was that the multiplicity of directorships sometimes held by one man rendered it plainly impossible for him to give due attention to the interests of any corporation. Instances have been cited of 40 or more directorships held by a single individual. Inevitably his knowledge was restricted to the affairs of a few of these corporations; in the meetings of the others his vote was cast according to the wishes of some other person. Directors thus voting were popularly known as "dummy directors."

The Clayton Trust Bill of 1914 sought to check the evil of interlocking directorates by prohibiting any one from serving as director in more than one corporation of a capitalization of $1,000,000 or more, except in the case of common carriers. Directors of corporations dealing in railway securities, or in railway materials or supplies to the extent of $50,000 or more per annum, were prohibited from serving as directors of railways. See Trusts; Railways; Corporation.

INTERLOCKING SIGNAL. See Block-Signal System.

IN'TERLOC'UTORY JUDGMENT. See Judgment.

IN'TERLUDE (ML. *interludium*, from Lat. *interlude*, to play between, from *inter*, between + *ludere*, to play). 1. In the drama, primarily a short performance interposed between the parts of a longer entertainment, as the play of *Pyramus and Thisbe* in the *Midsummer Night's Dream*. The term was early used of dramatic moralities (q.v.), played in the intervals of banquets and other court festivities. During the sixteenth century, however, interlude came to be the specific name for a rude form of dramatic representation which sprang from the moralities, and was, as it chanced, historically intermediate between those and true comedy. It differed from the former in that its *dramatis personæ* consisted not of abstractions of moral qualities, but of real persons; it was shorter in dialogue and of a merrier and more farcical nature. The most noted author of such plays was John Heywood (q.v.), who flourished at the time of the great controversy between the Roman Catholic church and the Reformed church in England. His *Four P's* is an excellent specimen of this phase of the drama. A Peddler, a Pardoner, a Palmer, and a Poticary each tries to tell the greatest lie. At last the Palmer happens to say that he never saw a woman out of temper, whereupon the others declare that his is the greatest lie that can be told, and gains for him the victory. 2. In music an interlude is a short melodious phrase played by an organist (generally extempore) between the stanzas of a hymn; also, any short instrumental selection played between portions of the church service. Consult: Collier, *History of English Dramatic Poetry*, vol. ii (London, 1831); Dodsley, *Collection of Old English Plays*, vol. i (4th ed., ib., 1874); Ward, *English Dramatic Literature*, vol. i (ib., 1875); Symonds, *Shakespeare's Predecessors in the English Drama* (ib., 1884).

IN'TERMAR'RIAGE. The intermarriage or intercourse of near relatives has been universally believed to entail degeneration upon the offspring, and the act has been condemned and prohibited. The physical deformity and mental debasement of the Cagots of the Pyrenees, of the Marrons of Auvergne, of the Sarrasins of Dauphiné, of the Cretins of the Alps, and the gradual deterioration of the slave population of America have been attributed to consanguineous alliances. More recently the same opinion has been supported by the history of deaf-mutism and of idiocy. Of 235 deaf and dumb children whose parentage could be traced, 70, or nearly 30 per cent, were the offspring of the intermarriage of blood relations. But in opposition to, and apparently destructive of, such an hypothesis may be adduced the unimpaired condition and symmetry of the Jews, of the small Mohammedan communities in India, of the isolated tribes in North America, among whom the repeated intermarriage of near relatives is compulsory. Moreover, this opinion does not hold in the analogous cases among the inferior animals. (See Breeding.) Darwin states that the first and fundamental law of heredity is that every attribute of the parents tends to be inherited by the offspring. Opposing influences counteract the tendency. If two brothers inherit strongly the characters of one of their parents, and if each transmits these characters strongly to his children, the cousins thus produced will have not only a close relationship of blood, but a close similarity of physiological characters, and if they marry, their offspring will be likely to be imperfect (Mercier). Insanity follows consanguineous marriages where the contracting parties inherit the same tendencies of a neurotic nature. If one of two brothers shows a reversion to a maternal ancestor, and the other inherits the father's character strongly, the first cousins springing from such brothers will have considerable physiological dissimilarity, and if these cousins marry, their offspring are likely to be well developed. See Consanguinity.

IN'TERME'DIATE STATE. The condition of the disembodied spirit from the hour of death till the general resurrection. 1. Probably the most popular view is that the souls of the righteous pass to heaven and those of the wicked to condemnation immediately upon death. 2. A second theory is that the intermediate state is one of sleep or unconsciousness. This was taught in the middle of the third century by certain Arabians called Thnetopsychites, and combated by Origen. It was disapproved by the University of Paris in 1240 and by Benedict XII in 1366. It was revived by certain Swiss Anabaptists and opposed by Calvin. It has been held by a few in later times, most notably by Archbishop Whately in his *Future State*. 3. It is held that an intermediate place is provided wherein the souls of the dead exist until the day of resurrection. The most definite form of this view is the Roman Catholic doctrine of purgatory. The church only lays down as *de fide* that there is a place of purification for departed souls and that the souls detained therein are aided by the prayers and masses offered by the faithful on earth (Council of Trent, sess. vi, xxii, xxv). The doctrine of purification after death for those who die in God's favor, but not yet sufficiently free from imperfections to enter His presence, is based upon such passages as Matt. xii. 32, 1 Cor. iii. 11–15, Matt. v. 25, 1 Pet. iii. 19, 20, iv. 6, as well as on the custom, of which Tertullian speaks at the end of the second century, of praying for the dead. The doctrine is also held to satisfy the demands of common reason, since many are not prepared at death to pass immediately into a state of perfect beatitude. As to whether purgatory is a definite place, and as to the method of purification employed, nothing has been defined; it is clearly understood, however, that no matter what are the pains incident to the purifying process, the souls undergoing it do so willingly and gladly, since they know that each moment brings them nearer to the goal of their desire, union with God.

The ancient Hebrew thought had no room for an intermediate state. With the rise of the ideas of a Messianic kingdom and a final judgment came the problem of the state of the dead before this judgment. This problem is first presented in the apocalyptic books, where the intermediate state is often one of rewards and punishments (Enoch x. 22, 100; Jubilees xxii, etc.). The teaching of Jesus does not discuss it, and the figures and parables which touch it are designed for ethical, not for dogmatic teaching. The writers of the New Testament reflect the thought of the current Judaism, which evidently had no well-defined theory. 1. In some passages the figure of "sleep" is used, and emphasis is sometimes laid, not on the blessedness of life after death, but on the "glorious appearing" of Christ at the resurrection (Thess. iv. 13–18). 2. Other passages show that the writers thought of the souls of the righteous as passing immediately into reward. Paul presents this view as well as the other (Phil. i. 23). It is natural that with this biblical variation there should be a variety of theories in the history of the Church.

Consult: Coleridge, *Prisoners of the King* (London, 1878); Jungmann, *De Novissimis* (Regensburg, 1871); Charles, *Eschatology, Hebrew, Jewish, and Christian* (London, 1899); and see Hades; Heaven; Hell; Immortality; Judgment, Final; Resurrection; Indulgence; Probation after Death; Purgatory.

INTERMEZZO, ĭn'tĕr-mĕd'zō (It., interlude). In larger instrumental works, a short movement in slow tempo inserted between two main movements. It generally takes the place of the slow movement if the composer does not wish to write a full andante or adagio, as in Beethoven's Sonata, op. 53. In Schumann's Concerto in A minor the intermezzo is sufficiently extended to be considered the legitimate slow movement of the work. Sometimes an entirely separate and independent composition bears the title intermezzo. Brahms seems to have had a special fondness for this title, using it for a number of pieces in op. 76, 117, 118, 119. In the old suite any extra movements added to the four obligatory ones (allemande, courante, sarabande, gigue) and always inserted between the third and fourth are called intermezzi. The intermezzos originally were short musical interludes or entr'actes which it was customary in Italy to perform between the acts of a tragedy. When the *opera seria* began to flourish in the seventeenth century, intermezzos treating some mythological subject were performed between the acts. Originally the different intermezzos had no connection one with the other. But gradually the intermezzo became a secondary plot. For the sake of variety it always treated a comic subject, so that a performance of an *opera seria* consisted alternately of a serious act of the opera itself and a comic act of the intermezzo. The next step was the emancipation of the intermezzo into a separate art form, the *opera buffa*. Its place in the *opera seria* was then taken by the ballet (q.v.). The intermezzos in the spoken drama of to-day are purely instrumental. See Incidental Music.

IN'TERMIT'TENT FEVER. A form of fever in which the rise of temperature above the normal (98.6° F.) is not constant, but in which there is a defervescence, or fall of temperature to the normal point, at intervals, to be followed by a successive rise to an abnormal point. The interval or intermission may be a few hours long (as in the double quotidian type of malarial fever) or it may be two days long (as in the quartan type of malarial fever). The intermittent form of fever occurs in abscess of the liver, in chronic obstruction of bile passages by gall stones, in Hodgkin's disease, in pyæmia, in pyelitis, in septicæmia, sometimes in secondary syphilis, in tuberculosis, and in some forms of malarial fever. The term, however, has been principally and popularly used to denote the ordinary tertian type of malarial fever, as a synonym of "chills and fever," and replacing the old term "ague." See Malaria; Remittent Fever.

INTER'NAL-COMBUS'TION EN'GINE. A form of prime mover utilizing the energy released in the form of heat when the combustion of a fuel or combustible takes place within the working cylinder of the engine. The pressure to move the working piston is the result of heating, to a high temperature within a confined space, the air required for combustion and the products of such combustion. The expansive tendency of such heated air and gases is the motive force. It is all released within the confines of the working cylinder and is not conveyed thereto by piping from a reservoir or receptacle exterior to it. This principle differentiates the internal-combustion engine from the hot-air engine (q.v.), in which the heat is imparted to the working medium (air) by transmission through the cylinder walls from without; and from the steam engine (q.v.), in which the heat from the combustion in a furnace is imparted to water and the resulting steam is allowed to pass in the form of pressure energy to the working piston. These last two may be called external-combustion engines.

The problems to be met and solved in an internal-combustion engine are threefold. The first is that of receiving the pressure energy of the heated air and gases and transmitting and transforming such energy so that it will do mechanical work. The second is that of the combustion of the fuel and the controlling of the inconvenient temperatures in respect to the materials of which the mechanical parts consist. The third is the problem of control of the energy (quantity of fuel) as the resistances may vary, and the controls of the time of admission and release of potential energy as respects the cycle of the cylinder action. The first and third problems are mechanical in kind, the second is chemicophysical, and each laps over or is interwoven with the other two. Moreover, in the internal-combustion engine the problems incident to size of the cylinder and consequent power capacity of the motor are not only different in degree in small engines and in large, but so different that they become really different in kind. The problems of the small engines, or those of less than 500-horse-power capacity, will be considered first.

The basic requirement of an internal-combustion engine is a confined space within which the combustion of the fuel and the increase of pressure consequent thereon may take place. This combustion chamber must have one or more movable, gas-tight walls capable of moving outward, that in such motion the work concept of a force acting through a space may be realized. (See **Work.**) This is most easily secured by having a cylinder within which fits a piston. Behind or above the piston is a space (usually about one-third of the space swept through by the piston in its stroke) into which the combustible mixture of fuel and air can be introduced and ignited. Under the pressure of such increase of temperature as the combustible mixture undergoes when fully heated, the piston will be forced outward and the space increased. Such piston motion must be controlled in extent and made available for a continuous motion which can be utilized. This is done by connecting the piston, by a connecting rod, to a crank on a revolving shaft, whereby the length of the piston travel is controlled, its energy used to rotate the crank shaft, and the piston itself brought back to the starting point for another stroke. On account of heat difficulties belonging to the second problem the cylinder is usually not closed at the end nearest the crank and shaft, and the cylinder is therefore single-acting or works only on the outgoing stroke and has atmospheric pressure on the crank end. Larger engines are sometimes or often double-acting, like the usual steam-engine cylinder.

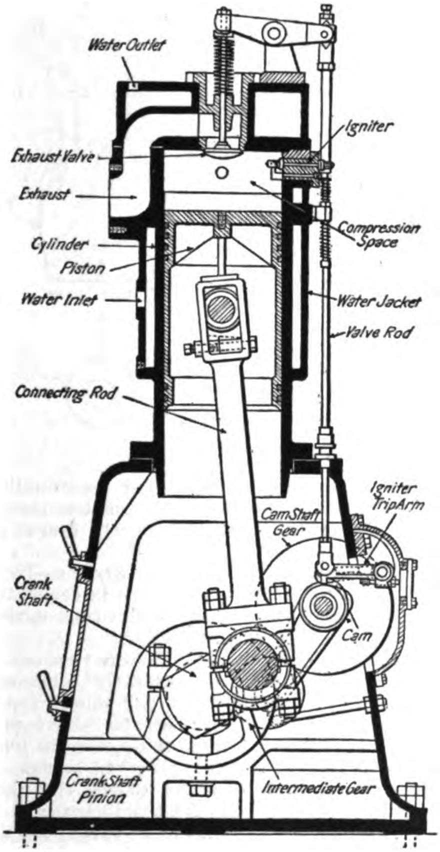


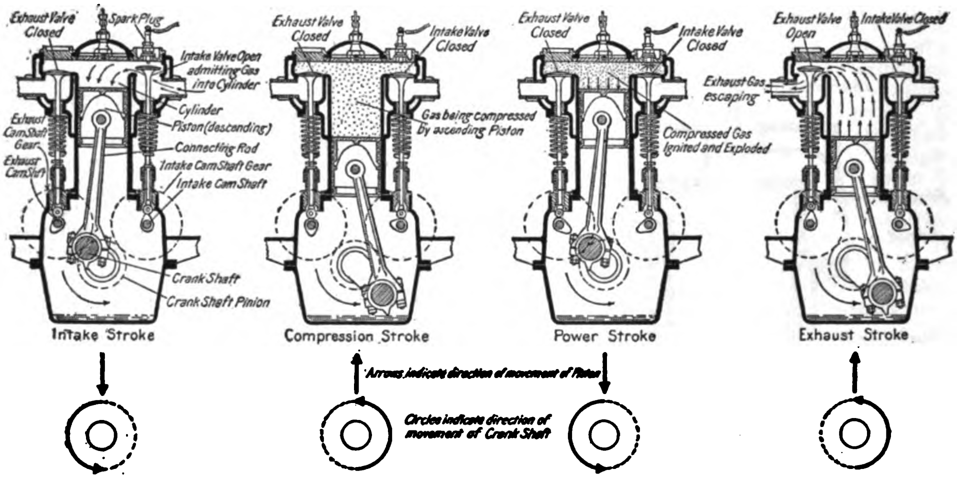
DIAGRAM OF SIMPLE VERTICAL INTERNAL-COMBUSTION ENGINE.

The walls of this pressure or working cylinder and of the combustion chamber which is its extension must be strong enough to resist any internal pressure produced on the ignition of the charge. They must be gas-tight, so that no loss of pressure may occur through leakage, but they must have openings, also capable of being closed gas-tight, through which the combustible mixture may be admitted and through which the products of combustion may be expelled after the expanding gases have done their work. These openings must be closed completely by valves when the pressure is driving the piston, and at the proper times of the piston stroke these valves must open. The high temperatures to which the valves are exposed are sources of trouble. Small valves were at first of the flat, sliding type, but the difficulty of making and keeping these tight and the troubles of lubricating them resulted in a replacement of the sliding type by the lifting or poppet type, which needs no lubrication and is easily ground tight in place. A sliding-sleeve type has reappeared for small motors, but it cannot be easily applied to larger sizes and has certain objections even in smaller sizes under the higher temperatures of heavy service. Large engines have lifting poppet valves with a water circulation in hollow channels within their figure to keep them from warping and distorting under heat.

The valves controlling the admission of the combustible mixture are called inlet or admission valves; those controlling the escape of the burnt gases are called exhaust valves. Both are usually operated by cams on a secondary or "lay" shaft driven by gears from the crank or motor shaft and having the cams so timed as to function at the proper moments and during the proper period. Sleeve valves may be driven by eccentrics and some noise and clatter of valve motion thus eliminated at high rotative speeds. The cams bear upon hardened steel rollers and at low speeds make no detectable noise. Rotary valves have been designed in which cylinders or parts of cylindrical surfaces slide over cylindrical seats either lengthwise or at right angles to the cylinder axis. These are cheap to manufacture and reduce losses by clearance, but they are not likely to remain gas-tight, nor can they be made so after they have become worn.

The admission valves and a separate "throttle" valve in the pipe or channel through which the fuel or the combustible mixture passes on its way to the engine is the means of controlling the speed or power of the engine by controlling each charge admitted to the cylinder. Governing of the speed and power of the internal-combustion engine can be effected by having a speed governor control the throttle valve and varying the weight of charge by varying its pressure and density, or by varying the duration of the period of admission by varying the cam action on the valve spindles. Larger engines usually govern by this latter method. The internal-combustion motor requires a flywheel on the revolving crank shaft to minimize irregularities of the turning effort caused by the intermittent pressure upon the piston. The mass of such flywheel will be less as the number of cylinders actuating the crank shaft is increased.

The second series of problems are those related to the combustion of fuel in the working cylinder. The first of these is that of securing perfect combustion, or complete union of the fuel elements with the oxygen of the air. Every particle of the fuel must be so intimately mixed with the air that its combustion shall be practically instantaneous. The fuel particle must therefore be so small or in so fine a state of division as not to be detectable by the senses of sight or touch. This means that the fuel must be in the gaseous state or in that of a mist or vapor and intimately mechanically mixed or disseminated through the air. The combustion is to be so rapid as to be comparable to that which takes place in an explosion. This requirement that the fuel in the cylinder at the moment of firing shall be a gas in effect makes the term "gas engine" (q.v.) synonymous with internal-combustion engine; but many internal-combustion engines make a liquid fuel supplied to them into the necessary gas by a process of carbureting the air supplied to them and are therefore not true gas engines. The term "internal combustion" is the broader and more comprehensive term and will apply to a wide range of fuel supplied—gas or liquid, volatile or non-volatile hydrocarbons, oils, tars, and petroleum distillates.



SUCCESSION OF CYCLES IN A FOUR-CYCLE GAS ENGINE.

The next consideration involved in the combustion is the introduction of the mixture of combustible fuel and air into the combustion chamber and the removal of the burnt gases after the working stroke has been completed. Experiments indicate that the best all-round results are secured when the proportion of air to gas in the mixture is from 10 to 13 to 1. This mixture in due proportion must enter the cylinder, and this can be brought about only by having the pressure within less than that without, or the pressure outside greater than that within. An early solution was to have two pumps, their volume being in the desired relation of gas to air, and to have these fill on an aspirating stroke and force their capacity into the working cylinder on a compressing stroke; or to have one pumping cylinder receiving both gas and air in desired ratio on its suction stroke and delivering the mixture on the displacing stroke. Furthermore, it was early proved mathematically that an internal-combustion engine was efficient in proportion as the combustible charge was compressed mechanically before being fired. Hence the debt of obligation to Dr. Nicholas A. Otto for working out the Beau de Rochas "cycle" in 1878, whereby the necessary functions for efficient operation could be realized in the single working cylinder by taking two revolutions of the crank shaft or four reciprocations of the piston in the cylinder to complete them.

This four-cycle, or more properly four-stroke cycle, requires:

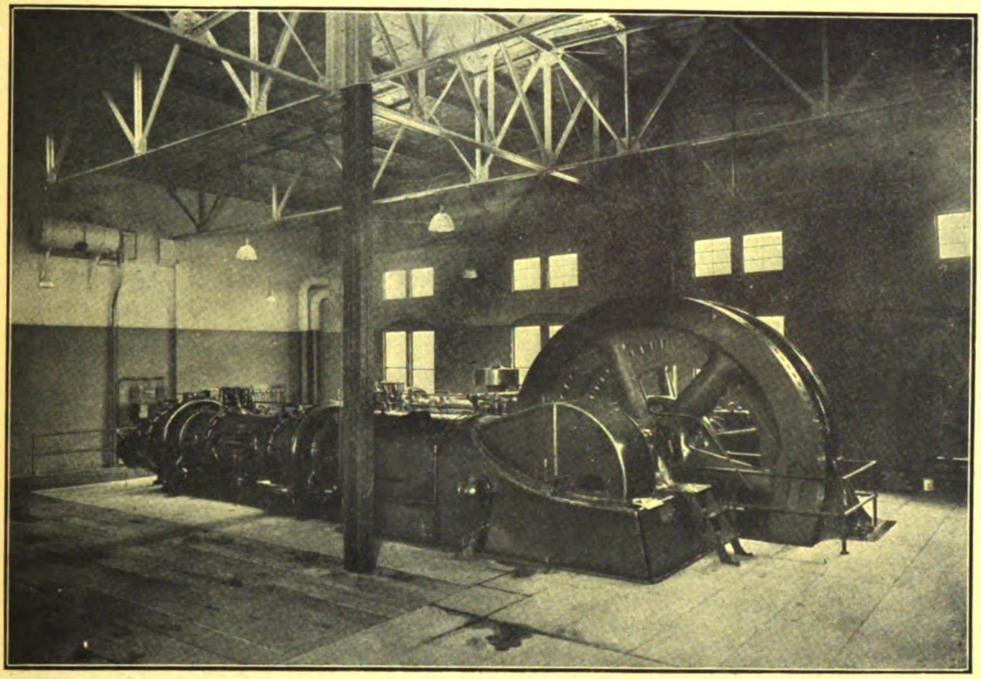
1. *Aspirating or Suction Stroke.*—Piston moves outward, lowering pressure in combustion chamber. Inlet valve open, combustible mixture flows in. Exhaust valve shut.

2. *Compression Stroke.*—Piston returns; inlet valve shut; mixture ordinarily compressed to about 40 pounds' pressure per square inch.

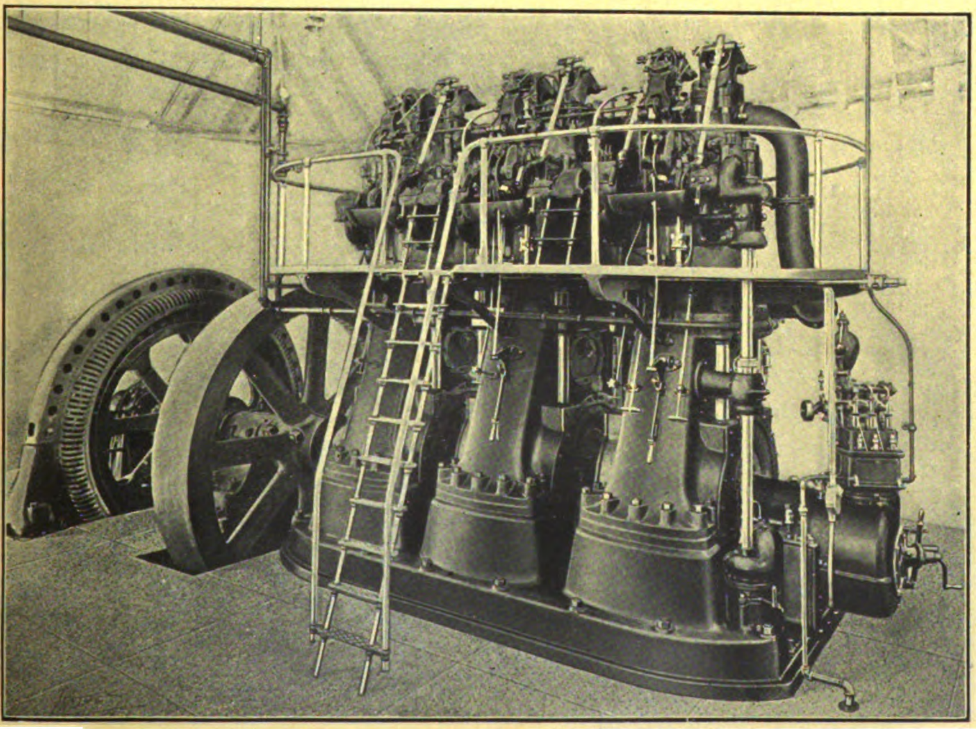
3. *Working or Power Stroke.*—Mixture is fired at or just before piston reaches its innermost position. Pressure rises to about 200 pounds per square inch and drives the piston outward. Pressure falls by the increase of the volume behind the piston. Both valves are shut during working or power stroke.

4. *Exhaust Stroke.*—Piston returns to position of No. 1 with exhaust valve open, inlet valve shut. Products of combustion escape. Exhaust valve shuts at end of piston traverse, so that only the clearance above or behind piston is left full of exhaust or burnt gases. Then the four-stroke cycle repeats itself.

The objection to the four-stroke cycle is that only one traverse of the piston in four is a working or power stroke. This is corrected by

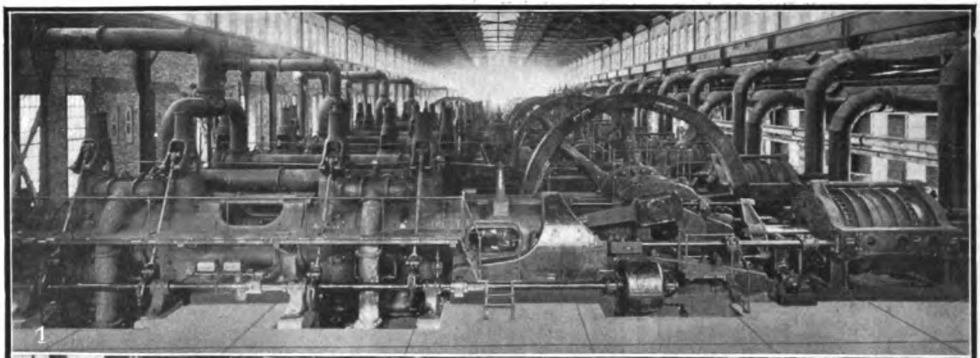


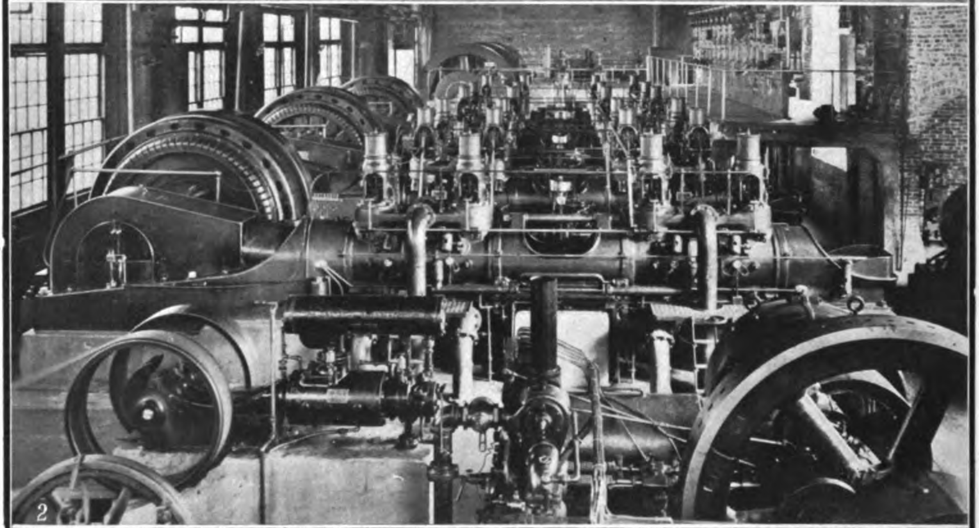
GAS ENGINE DEVELOPING 1200 HORSE POWER DIRECT CONNECTED TO A 60 CYCLE GENERATOR AT SHREVEPORT, LA. OPERATES ON NATURAL GAS

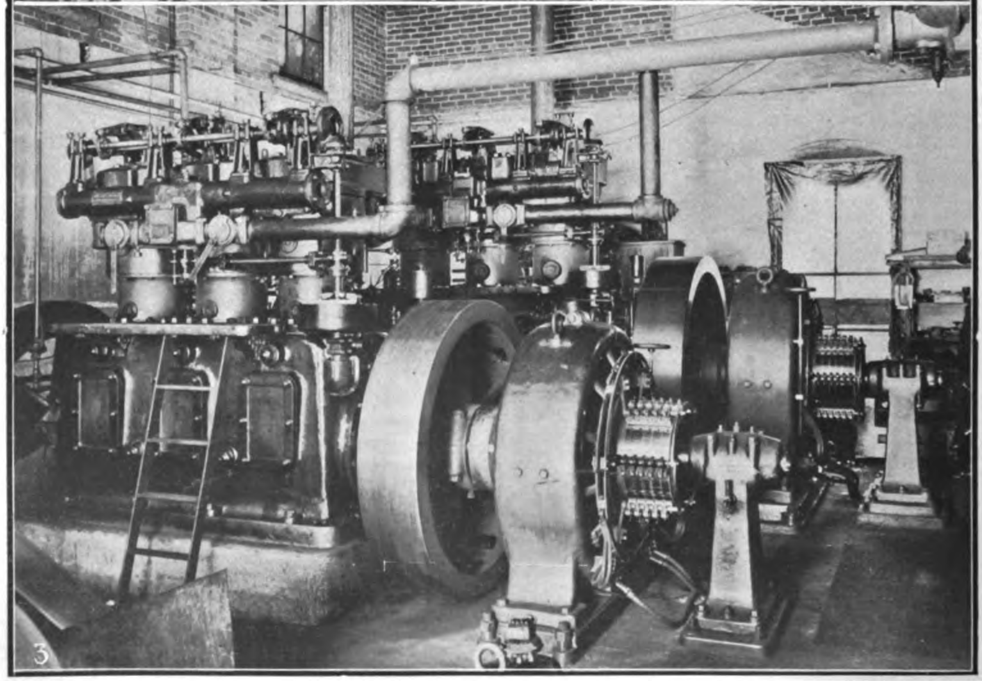


DIESEL ENGINE. TRIPLE CYLINDER 450-500 B.H.P. ENGINE, DIRECT CONNECTED, TO 375 KILOWATT ALTERNATOR. IN PLANT OF BRYAN WATER WORKS AND ELECTRIC LIGHT COMPANY, BRYAN, OHIO

INTERNAL COMBUSTION ENGINES

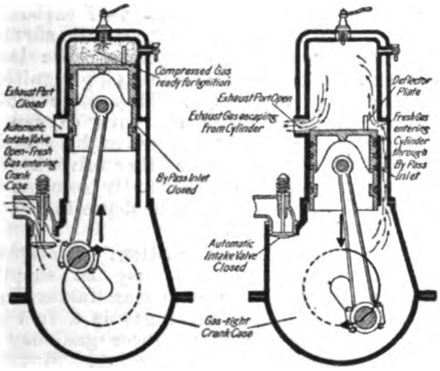






1. EIGHT 2900 B.H.P. HORIZONTAL TWIN TANDEM BLAST ENGINES AT INDIANA STEEL CO PLANT, GARY, IND
2. SIX 700 B.H.P. HORIZONTAL TANDEM DOUBLE ACTING NATURAL GAS ENGINES DRIVING 60 CYCLE ALTERNATORS
3. TWO 140 B.H.P. VERTICAL SINGLE ACTING PRODUCER GAS ENGINES

making four cylinders (or more) work upon one crank shaft, so that there are four (or more) working impulses in the two revolutions, as there would be in a double-acting single-cylinder steam engine.


Compressed Gas ready for Ignition
Exhaust Port Closed
Automatic Intake Valve Open-Fresh Gas entering Crank Case
By Pass Inlet Closed
Exhaust Port Open
Exhaust Gas escaping From Cylinder
Deflector Plate
Fresh Gas entering Cylinder through By Pass Inlet
Automatic Intake Valve Closed
Gas-tight Crank Case

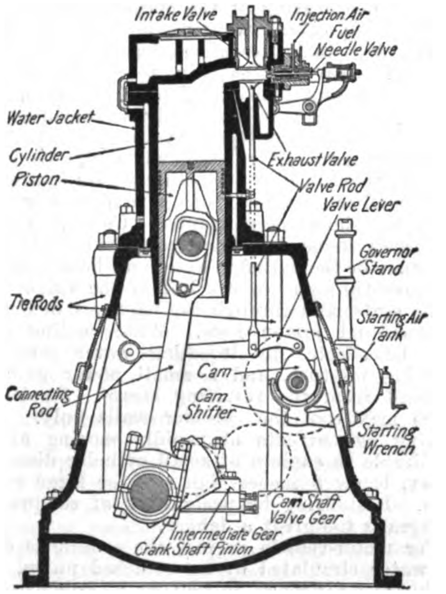
Compression Stroke　Power Stroke

SUCCESSION OF CYCLES IN A TWO-CYCLE GAS ENGINE.

The "two-stroke cycle," or, more briefly, the "two-cycle" engine seeks to secure the same cycle of operations in two traverses of the piston and thus to have one working stroke in one revolution of the crank shaft. It does this by inclosing the crank and connecting rod air-and-gas-tight, and causing the mixtures of gas and air to be drawn into such crank case by the inward or upward stroke of the piston, while the compression stroke is in progress above such piston. The sliding piston operates as its own valves, opening a port in the cylinder wall at the end of the working stroke to allow escape of burnt gases, and immediately thereafter opening an inlet port connecting the crank case and its contents with the space above the piston. The charge in the crank case has been compressed slightly by the outward traverse of the working stroke, enough to cause it to flow into the space above the piston when the intake port is opened, and it further acts to displace the burnt gases which dispute its occupancy there. A deflection plate neutralizes a tendency for the fresh mixture to rush directly out at the open exhaust port. The two-stroke cycle has the advantage that the crank shaft can turn in either direction, for the steps of the cycle change at the dead centres. There are no valves, since the sliding of the piston performs the valve functions; and the power strokes are twice as frequent as in the four-stroke cycle. There are dangers of annoying explosions in the crank case full of combustible mixture; the engine is not at its best with variable resistances, so that it is current practice to call its power 1.65 that of the four-stroke cycle engine of the same number of cylinders, instead of twice.

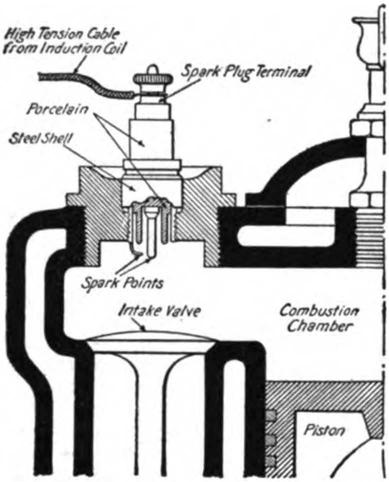
The Otto cycle in two-stroke or four-stroke engines assumes the combustion or heating process to take place without measurable change in the volume which the gases occupy. In scientific phrase, the heating is at constant volume. Two other types are practical: in one the heating may be done at constant pressure, but therefore necessarily with an increasing volume as the heat is supplied in each stroke. This was the cycle used by Brayton in his "ready-motor" of 1873. The other has the heating done at constant temperature and hence with both pressure and volume varying in the process. This is the cycle of the Diesel engine, first proposed in Germany, and used for stationary engines and even for marine purposes and railway locomotives. In the Diesel, and to an increasing degree in other cycles, the air only is highly compressed, and the fuel in liquid form injected into the air, to burn rapidly or more slowly therein. This diminishes the dangers of crank-case firing in the two-stroke cycle type, and in the Diesel type not only attains the high efficiency desired but simplifies construction and operation, since the high pressure is secured without dangers of preignition, and the high temperature of the compressed air makes the fuel ignite easily and surely, so that very non-volatile or reluctantly flaming hydrocarbons may be used, such as crude oil or distillate or tarry residues. The excessive high pressures specified give trouble with the pump and other valves.

The third combustion problem is that of firing or igniting the combustible mixture at the proper time. This is universally done electrically in recent designs, either from a magneto or dynamo, or from a storage or other battery, except where the high temperature of the compression and the combustion chamber are sufficient. The magneto can be low-tension with a secondary coil to raise the voltage, or high-tension current can be generated directly. The electric spark is caused to jump a gap between terminals which stand in the mixture to be ignited, and a local ignition at the gap is propagated through the mixture. In low-tension systems a "make-and-break" ignition may be used, the spark passing when an opening or gap is made in a closed circuit, across which the current must jump at the proper time. The terminals are usually mounted in the *jump-spark* system in a *spark plug* which has one or both terminals carefully insulated and so constructed that it can be conveniently removed and replaced if necessary. As there is also some lag or delay in the propagation of the flame on the electrical transmission to the terminals, the



VERTICAL SECTION OF DIESEL ENGINE.

timing of the spark passage should be variable with the speed of the motor for best effect, and a retarding of the spark can be used as a means of speed and power control. If the spark passes after the inner dead centre is passed, the pressure on the piston is much less than when the ignition or firing takes place in the more greatly compressed charge. Late firing makes an unnecessarily hot cylinder, and perhaps a flaming exhaust gas whose combustion was not completed within the cylinder. Ignition by an open flame, by incandescent metal, and by hot tubes have now only historic interest.



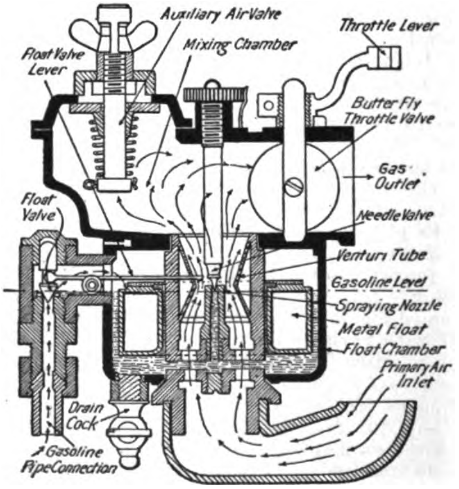
HIGH TENSION SPARK PLUG.

The fourth problem incident to internal combustion is the preventing of excessive temperature or overheating of the cylinder and valves. Overheating causes warping and distortion of valves and their seats so that they are not tight, excessive stresses in the metal of bed plates, undesired preignition of charges, the seizing of surfaces which should move easily over each other, and prevents proper and effective lubrication of rubbing surfaces. In large engines the difficulty of cooling makes it a question whether a diameter of cylinder greater than 18 inches should be attempted. Cooling is most effectively done by circulating water through passages in the cylinder walls and heads—*water jackets*—through hollows left in the valves and valve seats, and through the passages in hollow pistons and piston rods. Water-cooling may also be effected by injecting water into the working mixture, and a small power gain be realized from the resulting steam. Small engines may cool the cylinder walls only. Air-cooling by currents of rapidly moving air is applicable to engines of small cylinder diameter —say, below 8 inches—but not for large cylinders. Back-firing by preignition of compressed charges is too great a danger.

For motor-vehicle engines the cooling is done by water circulated by an attached pump, and such water air-cooled in its turn by being passed in thin films through a cooler or radiator over which air is moved by a rapidly revolving fan. Boat engines are cooled by circulating the water from outside the hull through the jackets. Cooling water in motor vehicles is not supposed to get hotter than 180° F. under heavy hauling, but in mountain work it is sometimes difficult to keep it from boiling, particularly at high altitudes. A certain amount of heat energy is carried off to waste with the water or air used in cooling, but to attempt to save this loss is to introduce greater practical difficulties than are represented by the value of the saving of heat.

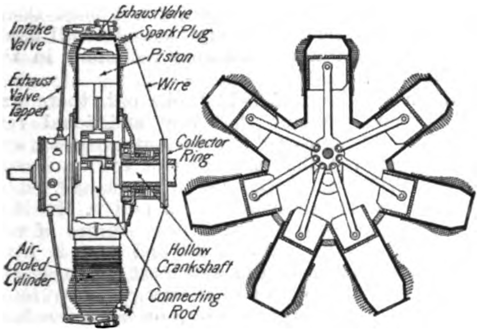
A fifth difficulty in internal-combustion engines is that due to the deposit of carbon or lampblack as a hard coating on metallic surfaces exposed to flame. These deposits cause leaky valves and pistons and also cause preignitions if they become hot enough. They are removed by scraping, by burning off with oxygen in oxyacetylene or other blowpipes, or by solution in tetrachloride of carbon or other solvent. The carbon is the result of reluctantly combustible elements in the fuel and from deposits left by the cylinder lubricants.

Carburetors and Carburation. Stationary internal-combustion engines may be supplied from a source of natural or of manufactured gas (q.v.). Usually the natural gas is a fuel gas low in illuminants, and producer gas may be cheaply manufactured for engines. But for portable engines, such as those used in motor vehicles and boats, storage tanks of compressed gas are not economic or desirable, and the liquid fuels are more easily obtained, more convenient, and usually cheaper. Hence, in such cases, the internal-combustion motor must be supplied with an accessory device to make the liquid fuel into a gas as it is needed by the engine. The convenient type of gas to be so made and supplied is an air gas, made by carbureting air or saturating it with as much vaporized or atomized hydrocarbon as it will carry without dropping. Most carburetors depend on the principle of injecting by pressure through a small nozzle a jet of the liquid into a moving current of air. The latter absorbs the liquid, divided as it is into atomized particles, and thus intimately mixes the fuel and air, so as to make either a true combustible gas or a fog or mist, which will burn like a gas when it meets additional air to support such combustion. This process is called carburation. The liquid fuel must be kept at constant head and at a level such that no flow of fuel shall take place except when needed. This is accomplished by means of



VERTICAL SECTION OF TYPICAL FLOAT FEED CARBURETOR.

a float in a chamber forming part of the carburetor. This float controls a fuel flow or feeding valve from the fuel supply pipe and is borne upon the liquid fuel in the float chamber. As the desired level of fuel in the float chamber is reached, this float will rise and by its attached valve stop the flow from the fuel reservoir. The fuel jet pipe or passage leads from the float chamber and terminates in the pipe or passage carrying air to the cylinder inlets. The orifice or nozzle is adjusted to be about 1/16 of an inch above the level of the liquid in the float chamber when pressures at the jet and in the float chamber are the same. Under these conditions no flow takes place until the pressure at the orifice of the jet and in the air pipe is reduced by the movement of the piston during the aspirating stroke of the cycle in the engine cylinder. This reduced pressure does not affect the air on top of the fuel in the float chamber, and at once a jet of the liquid fuel is forced through the nozzle mixing with the flowing air, and carburation occurs. It is the necessity for making this suction pressure at the jet to carburet the air that makes it necessary to "turn the engine over" or "crank" the engine for the first stroke of the pistons in starting. The fuel jet is usually made capable of adjustment for a quantity of fuel per second, to meet variable speeds of motor; and in addition a second adjustment, either automatic or hand-controlled, is added to prevent a proportionate excess flow of liquid at the higher speeds or when the aspiration fall of pressure is the greatest. This is either an automatic air valve opening only under such lowered pressure of the greater suction; or the flow of fuel is cut off proportionately as the suction pressure is lowered. Excess fuel is not only wasteful, but a mixture too rich in fuel ignites less easily and deposits soot and carbon. Where liquid fuel is injected into highly heated compressed air, the carburetor can be dispensed with, as in the Diesel system. The principle of carbureting air by means of a carbureting device was a great step in the progress of the internal-combustion motor and was first taken by Maybach and Daimler.



Sectional Side View Diagrammatic End View

GNOME ROTARY AËROPLANE MOTOR.

The diagram above shows a typical rotary aëroplane motor, with a number of cylinders whose pistons act on a single shaft, and indicates how the problem of obtaining maximum power with minimum weight has been satisfactorily solved in one type engine of which there are numerous examples. The Gnome motor illustrated above has had considerable vogue, both in Europe and the United States for aëroplanes, and has been built up to 160-horse power and with as many as 9 cylinders, making 1200 revolutions per minute. The action of this motor will be apparent from the diagrams shown after reading the explanation of the vertical engines on the preceding pages. Aëroplane motors are also made with vertical cylinders as in an automobile engine with a V-arrangement of the cylinders, and may be water-cooled as in the case of the Curtiss and Wright motors, instead of being air-cooled as in the Gnome motor.

Starting the Engine. The cycle of the internal-combustion motor is a complete process. It leaves no energy stored except in the revolving flywheel, and hence when the engine is to be restarted after a stop some energy must be drawn upon external to the engine itself to cause the first stroke. This may be muscular effort of man in small engines, when the resistance of the compression is not too great for his strength. In larger engines a supply of compressed air in a reservoir may be drawn upon, the pressure being exerted on the motor piston of one or more cylinders to turn the crank shaft and allow the others to draw in the combustible charges and fire them. Or the starting may be done by turning the crank shaft by an electric motor. The compressed-air system is preferred for larger engines, the engine compressing the air into tanks by means of a compressor which it drives while running. The necessity for starting by external power makes it desirable that the useful resistance or work of the engine be disconnectible from it, so that the external power shall have only the internal resistance of the engine to overcome during the starting process. A clutch or engaging device is therefore a feature in nearly all internal-combustion motors, so that its crank shaft can be turned without turning all the machinery which it is to drive.

Advantages of the Internal-Combustion Engine. The Internal-Combustion principle offers the following advantages:

1. There is no stored energy in form of heat and pressure, as in the steam boiler, which may deal destruction if the shell is ruptured.
2. It has not the weight and bulk of boiler, chimney, and furnace, and the economic losses in indirect heating of the power medium.
3. The inconveniences due to poor water or to the absence of water in arid territory do not occur.
4. Licensed engineers are not required where there is no boiler with its dangers.
5. The engine is ready to start without delay for getting up pressure.
6. The expense of operation stops when the engine stops.
7. The machine is self-feeding as respects fuel, so that a second man is not required, and there is no trouble from ashes nor from sparks.
8. A high rotative speed and light weight per horse power are possible; this adapts the internal-combustion type for aëroplane work.
9. The higher thermodynamic efficiency of the operation.

Disadvantages of the Internal-Combustion Engine. 1. The motor has to be started by an auxiliary power, usually accumulated or stored from a previous running of the engine.

2. The four-cycle type does not reverse its direction of rotation, but where occasional reversals are to be required these must be secured by gearing in the transmission machinery between the motor and its work.

3. It is efficient at only one speed, and to meet lower speeds of the resistances it must be geared down in order to secure power.

4. Its superior limit of speed and power cannot be exceeded in emergencies.

5. It has only one power stroke in four piston traverses; hence to secure uniform turning ef-

fort for every traverse of the piston, or half-revolution of the crank shaft, the number of cylinders has to be increased.

6. If anything interrupts the functioning of the fuel supply or the ignition, the engine stops short and without a period of warning.

Capacity and Efficiency. The largest single unit internal-combustion engine of the present day has a capacity of 2000-horse power in its four cylinders. Where larger capacities than these are desired, they are secured by duplicating or multiplying the units, or by a return to the steam-engine or steam-turbine principle. The efficiency of the internal-combustion engine as a heat engine has been raised to 0.27 in special examples, and is about 0.20 for small types. Small gas engines are nearly as efficient as large ones, while small steam engines are much less efficient than large ones.

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INTERNAL-REVENUE SYSTEM. The revenue derived by the United States government from taxation other than that of imports is commonly designated as internal revenue. In its widest sense the term includes the direct taxes levied in accordance with the constitutional rule of apportionment according to population, in 1798, during the War of 1812, and in 1861. But as the constitutional rule noted differentiates such direct taxes widely from all other forms of internal taxation, we may properly exclude them from the discussion of the internal revenue.

Internal taxation did not acquire a permanent place in the fiscal system until 1862, though the nation had, in 1794, 1800, and 1813–17, gained some experience in this form of taxation. This earlier experience was not without value to the financiers of the Civil War and may be briefly examined here.

Soon after the inception of the national government the revenues proved to be inadequate. The fiscal policy of Hamilton had not sought to evade the responsibilities which the creation of a national government imposed, and the burden of State debts created in the common struggle for independence was assumed by the nation. The debt charges assumed in this manner were considerable, and the customs revenues insufficient to discharge them. As early as March, 1790, the Secretary of the Treasury proposed that excise taxes be laid upon snuff and tobacco, carriages, sales at auction, stamps, and on wines and distilled spirits. Alcoholic beverages were subjected to a moderate tax by an Act of March 3, 1791. Liquors produced from foreign materials were taxed at rates ranging from 11 to 30 cents a gallon, and those produced from domestic materials at rates ranging from 9 to 25 cents. The act was very unpopular and gave rise to much opposition, which interfered greatly with its operation, increasing the costs of collection and diminishing the returns. Nowhere was this opposition stronger than in western Pennsylvania, where in 1794 a display of military force was necessary to put down the uprising known as the Whisky Insurrection (q.v.). Despite the falling off in receipts due to this opposition, the revenues could not be dispensed with, and further taxation became imperative. In June, 1794, carriages, sales at auction, snuff, sugar, and tobacco were made taxable, and licenses were required for the sale of wines and liquors. Taxes on legal instruments were imposed in 1797. These measures were enacted in the face of vigorous opposition. As to the carriage tax in particular, the constitutional objection was raised that it was a direct tax and not levied in the manner prescribed, and when this failed to impress Congress, the matter was carried to the courts. The Supreme Court of the United States, in Hylton *v.* The United States, upheld the act, and in effect declared that land and capitation taxes were the only direct taxes in the constitutional sense. The opposition to this form of taxation was due to the fear that thereby the Federal government would gain increased power, and we may well surmise that Hamilton's advocacy of these measures was in part influenced by the desire to assert as soon as possible all the power which he believed to reside constitutionally in the Federal government.

With the rise of the Democratic party to power in 1801 all forms of internal taxation were abandoned. Party principles were opposed to them, and the treasury did not need them. Revenues from customs amply supplied all needs and permitted a considerable reduction in the public debt.

When the War of 1812 broke out, there was at first no thought that any additional revenues would be needed for current expenses, and it was believed that the costs of the war could be met by loans. Both public revenue and public credit were impaired by such a policy. In 1813 it became necessary to seek new sources of revenue, and, by acts of July 24 and Aug. 2, 1813, those taxes which had proved most advantageous before the opening of the century were reimposed. Duties on carriages, on sugar refined in the United States, license taxes on the distillers of spirituous liquors, and on retailers of wines and spirits, with stamp duties on legal instruments, etc., and taxes upon sales at auction, reappeared. These taxes were, however, designated as temporary, and the pledge was made that they should be repealed within a year from the close of hostilities. As it took some time to create the machinery for the collection of these taxes, the actual returns were slow in coming in. Before any appreciable revenue had been derived from this source ($1,662,984 being collected in 1814), rates were increased in December, 1814, and new taxes were imposed in January, 1815. They embraced pig iron, iron castings, bar and rolled iron, nails, candles, paper, leather, playing cards, vellum, hats, umbrellas, saddles, bridles, boots, shoes, beer, ale, tobacco, cigars, and snuff.

For the actual conduct of the war these taxes came too late to be available, but in the settling up of accounts they proved of great assistance. The Secretary of the Treasury was unwilling to part with them wholly and advocated the retention of a part of the excise system in order to meet any emergency which might arise. Congress, however, by Act of Dec. 23, 1817, abolished these taxes, and no further resort was had to internal taxation until the Civil War.

When the great struggle opened, it was generally believed that the war would soon be terminated, and that the expenses of the contest could be entirely provided by loans. As in 1812, there was a delay in the creation of new sources of revenue. A direct tax of $20,000,000 was levied on the States by Act of Aug. 5, 1861, but it was not until July 1, 1862, that an Act was passed to raise any considerable revenue from internal taxation. The law embraced almost every conceivable object of taxation. There were taxes on liquors of all kinds, license taxes upon merchants, taxes on all manufactured articles, on auction sales, carriages, yachts, billiard tables, plate, the gross receipts of railroads and other transportation companies, on the dividends of banks, trust, savings, and insurance companies, on advertising, on incomes over $600, on legacies, and stamp taxes upon bills of exchange and other mercantile papers. It took some time to establish the machinery necessary to the proper administration of this system of taxation; it produced in the fiscal year 1863 only $37,640,787, though its advocates had anticipated a revenue of $100,000,000. In the following fiscal year these taxes produced $109,741,134, without any change in rates. The demand for increased revenue led, June 30, 1864, to increased rates. New objects of taxation were discovered, and rates were considerably increased upon articles already taxed. On manufactured products generally the rate ranged from 3 to 5 per cent, while on specific articles it was doubled. On liquors rates rose from 60 cents per gallon, under the Law of March 7, 1864, to $1.50 and $2, while the maximum rate on tobacco rose from $3.50 per thousand to $40 per thousand, the latter rate applying to cigars valued at $45 per thousand. The revenue rose in the fiscal year 1865 to $209,464,215, but it was not in those articles which were so extravagantly taxed that the increased revenue was most conspicuous. Indeed, the product of the tax on distilled liquors fell from $30,329,149 to $18,731,422, while that of the tobacco taxes rose only from $8,592,098 to $11,401,373. A further increase of rates was made by an Act of March 3, 1865, and the fiscal year 1866 with revenues of $309,226,813 showed the high-water mark of internal-revenue receipts.

The increase of revenue resulting from these several acts was rapid, and the annual deficit grew relatively smaller, as compared with revenues, although it increased absolutely as the war progressed. Even more important, perhaps, than the actual revenue received was the improvement in public credit, which resulted from these serious efforts to place the revenues on a sound basis. The last act, while raising rates, contemplated their speedy reduction and provided for the appointment of a revenue commissioner charged with the duty of studying the whole revenue system and proposing suitable modifications. Extraordinary military expenditures were no longer required, but the general scale of national expenditure was vastly greater than before the war. The abolition of internal-revenue taxation was not thought of, but a reduction of the burden and the removal of some of the more vexatious taxes were generally demanded. By a series of acts in the years 1866, 1867, and 1868 many taxes were abolished, and rates on many others diminished. It was estimated that $196,000,000 would be taken from the revenue, but the actual diminution was less than $1,250,000. The greater productivity of moderate rates was amply demonstrated. In the case of distilled spirits a rate of 50 cents a gallon, enacted July 20, 1868, produced in the fiscal year 1870 a revenue of $55,606,094, while the maximum revenue under the $2 rate in 1867 had been $33,542,951.

In 1870 taxes still remained on spirits, tobacco, fermented liquors, gross receipts, licenses, incomes, legacies, successions, gas, stamps, and some few other articles. The income tax, which in 1870 had produced $37,775,873, was abandoned in 1872. The tax on spirits was raised to 90 cents in 1875, but elsewhere, especially on tobacco, there was a reduction of rates, and all stamp taxes ceased in 1883. While ultra-protectionists like William D. Kelly urged the abolition of all internal taxes, this plan did not secure any large following, the sentiment in favor of taxing liquor and tobacco, the main supports of the internal revenue, being well-nigh universal. The experience of recent years has, moreover, firmly demonstrated in the minds of the people that such taxation of the internal resources of the nation is an indispensable element in any revenue system, since it is capable of adjusting itself to the needs of a sudden emergency.

No essential changes were made in the system of internal taxes till 1894, when the Tariff Act of August 28 sought to compensate for the prospective falling off in customs duties by raising the tax on distilled spirits from 90 cents per gallon to $1.10 per gallon and by imposing a tax upon incomes. The Supreme Court of the United States decided the income tax established by the law to be unconstitutional (see Income Tax), while the increased rate on spirits did not prevent a diminution of revenue from that source.

When, in 1898, war was declared against Spain, internal taxation was chiefly relied upon to meet the increased expenditures. In framing the War Revenue Act of 1898 there was ample experience to draw upon, and that measure shows a judicious use of the taxing power. The act, which went into effect on July 1, 1898, provided an increase of rates upon some articles and reëstablished some of the taxes which the experience of 1862 and 1870 had demonstrated to be most productive. It imposed a special tax on bankers, brokers, proprietors of theatres, circuses, and other entertainment enterprises, tobacco dealers and manufacturers. It left untouched the rates on distilled spirits. On fermented liquors and also on tobacco and snuff the rates were doubled, while on cigars and cigarettes, previously heavily taxed, they were slightly increased. An important feature of the law was the imposition of stamp taxes upon mercantile papers of all kinds and upon proprietary articles (patent medicines) and wines. The revenue receipts under the law as amended are shown in the following table, which gives for comparison the years 1897 and 1898:

Fiscal year ending	Internal revenue receipts
June 30, 1897	$146,688,574
June 30, 1898	170,900,681
June 30, 1899	273,437,162
June 30, 1900	295,327,927
June 30, 1901	307,180,664

A comparison of receipts in 1897 and 1899 will show the effect of the new law and will also reflect the increasing prosperity of the country, as shown in the larger returns of 1899 in the foregoing table, without change of rates:

FISCAL YEAR ENDING JUNE 30

RECEIPTS FROM	1897	1899
Spirits	$82,008,542.92	$99,283,534.16
Tobacco	30,710,297.42	52,493,207.64
Fermented liquors	32,472,162.07	68,644,558.45
Special taxes	....	4,921,593.21
Legacies	....	1,235,435.25
Stamps	....	43,837,816.66
Miscellaneous	1,628,691.06	3,068,426.07
	$146,819,693.47	$273,484,571.44

With the return of peace the demand for a reduction of revenue became general. By a Law of March 2, 1901, taking effect July 1, 1901, considerable reductions were made, the tax on fermented liquors being reduced from $2 per barrel to $1.60, the maximum cigar tax going back to what it was before the war, while all stamp taxes on proprietary articles and the most troublesome taxes on business papers, such as bills of lading, express receipts, certificates of various kinds, insurance contracts, mortgages, bank checks, and telegrams, were repealed. A further Act of March 2, 1902, which went into effect July 1, 1902, removed the last vestiges of the war taxes, old rates being restored and the remaining new taxes being abolished. By Act of Aug. 5, 1909, a new element was added to the internal-revenue system by the so-called excise tax on the net earnings of corporations. This tax was fixed at one per cent on all earnings above $5000. This tax was transformed into an income tax on corporations by the Law of 1913. (See Income Tax; Taxation.) By the same law taxes on individual incomes were incorporated in the system. The relative importance of the two new elements is indicated by the following figures for 1914:

Ordinary internal revenue	$308,613,483
Revenue from corporation tax	43,079,819
Revenue from individual income tax	28,306,336

See Finance; Tax and Taxation; Income Tax.

IN'TERNA'TIONAL. See International Workingmen's Association.

INTERNATIONAL AF'RICAN ASSO'CIA'TION. See African International Association.

INTERNATIONAL BOUND'ARY TRIBU'NAL. See Alaska, *History*.

INTERNATIONAL COP'YRIGHT'. See Copyright.

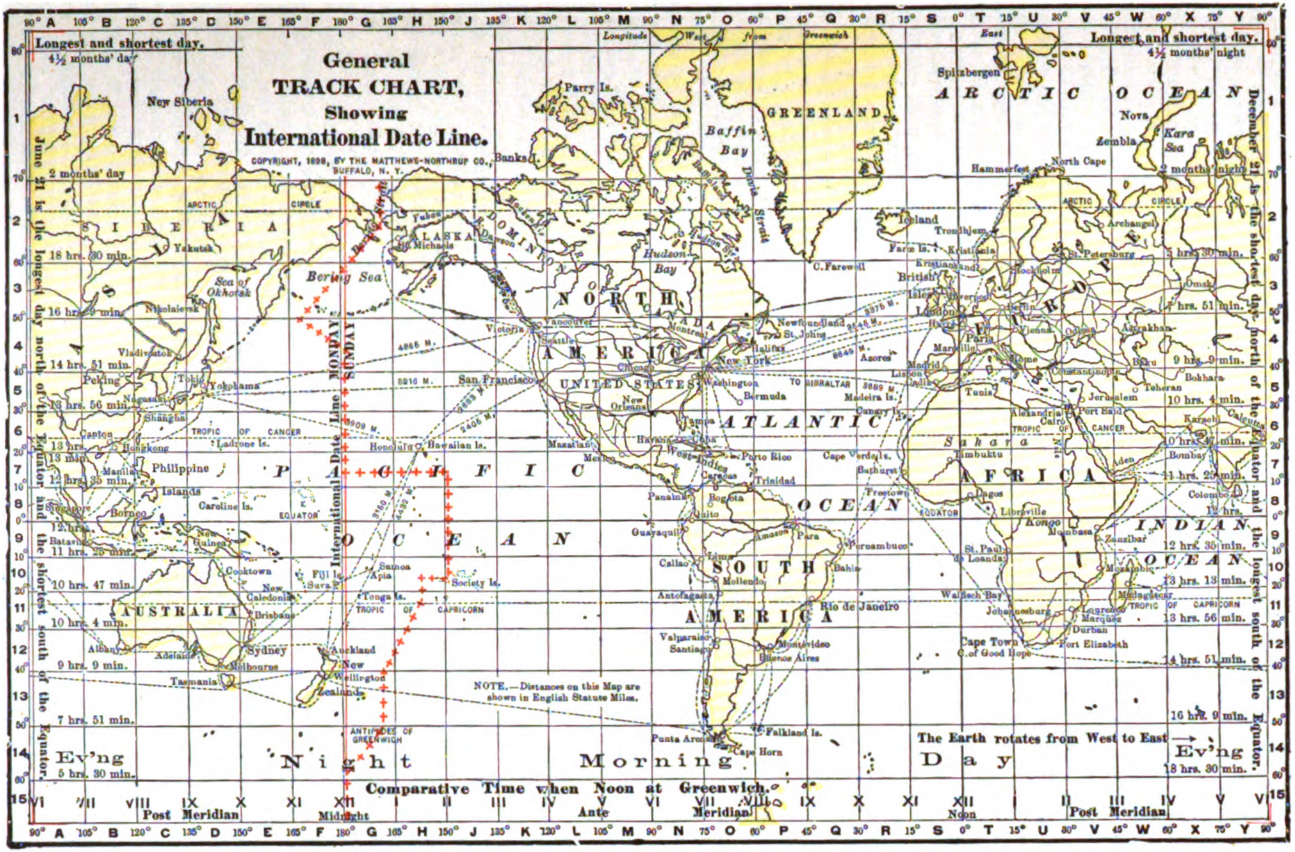
INTERNATIONAL DATE LINE. An irregular line drawn somewhat arbitrarily on the map of the Pacific Ocean, near the 180° meridian of longitude. It marks the place where navigators "change their date" on the trans-Pacific voyage. The following is a brief explanation of the cause of this change of date. When a person travels westward, he lengthens his day by one hour for every 15°, since he moves along with the motion of the sun; by going westward entirely round the earth, lengthening each day by a certain amount, four minutes for every terrestrial degree he travels, he will have lost one day at the arrival at the starting point. The second of a month, e.g., is to him the first; Monday is Sunday, according to his reckoning. This is obvious, since by going round the earth from east to west he has, in respect to himself, diminished by one the number of revolutions made by the earth during this time. Going round the earth eastward the reverse takes place, and a person gains one day, since he makes one more revolution than the earth does. Thus, two persons, having started from the same place and traveled round the earth in opposite directions, when they meet at their place of starting, will differ from each other two days in their reckoning. Thus, it becomes necessary to have a date line somewhere on the earth's surface, since it is impossible that the reckoning of days should go unbroken round the earth. Any meridian might do theoretically for this purpose, but for two important practical reasons the 180° meridian of longitude has been chosen for the international date line. These two reasons are: (1) that it lies nearly in the middle of the Pacific Ocean and thus far away from civilization; (2) it is exactly 12 hours from Greenwich. Thus, the theoretical date line coincides with the 180° meridian; but for reasons of convenience an arbitrary irregular line has been adopted in its place. This line is shown on the accompanying map; it has the advantage that no change occurs between important neighboring islands.

Since the line is an arbitrary one, we might expect cartographic authorities to differ considerably in its delineation; and this is, in fact, the case. Indeed, to have such a line drawn with perfectly definite authority, it would be necessary for the principal nations to have the line determined by a joint commission and then to adopt the commission's recommendations by international agreement or treaty. But this has never been done, and so in one sense it may be said there is no *international* date line. The term has, however, come into general use and may well be employed pending such governmental action. It is possible, however, to mark out the line as it is actually used in the Pacific islands. For this purpose it is merely necessary to find out, by correspondence with all the various settlements, whether the date in public use is the American or Asiatic one. Correspondence of this kind was carried on by Prof. George Davidson, of the University of California and formerly of the United States Coast and Geodetic Survey. His results were published by the United States government and form the basis of the accompanying map, which presents unquestionably the most authoritative date line so far placed at our disposal. The principal change from other recent authorities transfers Morell Island to the east of the line. The change of the Samoan Islands from west to east was made by order of King Malietoa in 1892. See Antipodes; Time, Standard.

INTERNATIONALE. See International Workingmen's Association.

INTERNATIONAL FUR SEAL CONVEN'TION. See Sealing.

INTERNATIONAL IN'STITUTE OF AG'RICULTURE. A world institution, located at Rome, Italy, for the collection and dissemination of statistical and other information relating to agriculture. Its chief object is to furnish to the various countries prompt and reliable estimates and statistics of agricultural production and distribution, general information re-


General
TRACK CHART,
Showing
International Date Line.
COPYRIGHT, 1898, BY THE MATTHEWS-NORTHRUP CO., BUFFALO, N. Y.
Longest and shortest day.
4½ months' day
Longest and shortest day.
4½ months' night
June 21 is the longest day north of the Equator and the shortest south of the Equator.
December 21 is the shortest day north of the Equator and the longest south of the Equator.
International Date Line
MONDAY
SUNDAY
NOTE.—Distances on this Map are shown in English Statute Miles.
The Earth rotates from West to East →
Ev'ng
Night
Morning
Day
Ev'ng
Comparative Time when Noon at Greenwich.
Post Meridian
Midnight
Ante Meridian
Noon
Post Meridian
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
INDIAN OCEAN
NORTH AMERICA
SOUTH AMERICA
AFRICA
EUROPE
ASIA
AUSTRALIA
GREENLAND
SIBERIA
Longitude West from Greenwich
East

Theoretically the change of date should be along the 180 meridian of longitude. For practical purposes the International Date Line has been generally adopted as marked on the map, thus: ++++++++++++

garding the progress of the industry and means for its improvement, and matters pertaining to the economic and sociological aspects of agriculture. It is under the patronage of the King of Italy and is supported quite largely by the joint contributions of the adhering countries, numbering about 50.

The establishment of the institute was due to the initiative of David Lubin, a prosperous business man of Sacramento, Cal., who after various attempts to win support for his plans in a number of countries succeeded in interesting King Victor Emmanuel of Italy, who called a conference of the nations in 1905. This conference was held in Rome and was attended by delegates from 40 countries. The enterprise received approval, and a treaty was formed providing for the organization and maintenance of the institute as a permanent institution and defining its field of operations. The King of Italy endowed the institute with revenues amounting to about $60,000 annually, and the Italian government has erected a handsome building for its use in the environs of Rome.

The institute is governed by a general assembly of delegates from the constituent countries, held every two years, and a permanent executive committee, composed of one member from each country. This permanent committee directly manages the institute. Its chairman is president of the institute. The general assembly reviews the work and the plans of the institute, approves the budget, and considers various matters relating to its methods and development. For example, the fourth session of the assembly, held in May, 1913, discussed methods of crop reporting, an international service of statistics, live-stock statistics, agricultural coöperation, crop insurance against hail, an international service of agricultural meteorology, proposal for an international agreement for the control of plant diseases and insect pests, protection of useful birds, and investigations on dry farming.

The work of the institute is divided among four bureaus: (1) the bureau of the secretary general, (2) the bureau of general statistics, (3) the bureau of agricultural intelligence and plant diseases, and (4) the bureau of economic and social institutions. The bureau of the secretary general deals with the *personnel*, financial, and other routine business, printing and distribution of publications, the library and bibliographical work, and the preparation and publication of an annual compilation of agricultural legislation in the different countries of the world. This *Yearbook of Agricultural Legislation* records the progress in the domain of law of the world-wide movement for the improvement of the economic and legal conditions of agriculture and rural communities.

The bureau of general statistics collects, collates, and publishes statistics of production and commerce in agricultural products, both animal and vegetable, throughout the world. These statistics are supplied by the adhering governments, the object being to secure a prompt dissemination of knowledge regarding the prospective and the actual world's supply of important products, farm live stock, etc. Monthly bulletins and an annual report on agricultural statistics are issued. The bureau of agricultural intelligence and plant diseases collects and publishes matter of interest regarding the progress of scientific and experimental investigations and practical experience in agriculture throughout the world, and as a branch of this work gives special attention to the diseases of plants and to entomology. The bureau of economic and social institutions gathers and publishes statistics and general information in regard to agricultural coöperation, insurance, and credit, together with other matters relating to the economic and social organization of rural communities. Each of these bureaus issues a monthly bulletin upon its work.

The institute has accumulated a large library of the world's agricultural literature, and issues a weekly bibliographical bulletin containing a list of the works received, notices of articles of general interest in the periodicals, and titles of legislative acts relating to agriculture. A universal bibliography of agriculture is planned. French is the official language of the institute, but the monthly bulletins are now issued in the French, German, English, Spanish, Italian, and Hungarian languages, the expense of translation and separate publication being borne by the respective countries. This attests the appreciation in which the publications of the institute are held.

The institute also endeavors to promote various enterprises which are of interest to one or more countries and which can be helped through this international agency. Thus, it aided the commissions on rural credit sent from the United States to study the subject in Europe in 1913, and it served as a meeting place of the International Phytopathological Conference in 1914, collecting in advance a vast amount of information regarding the inspection services in different countries.

The budget of the institute for 1914 was about $220,000—a considerable increase, growing out of the development of its activities, which necessitated raising the contributions of the adhering governments. The officers of the institute in that year were president, Marquis Cappelli, of Italy; vice president, M. Louis-Dop, of France; secretary general, Prof. G. Lorenzoni, of Italy. Mr. David Lubin has represented the United States on the permanent committee since the institute was established.

Consult *L'Institut International d'Agriculture, son organisation, son activité, ses résultats* (Rome, 1912), and "International Institute of Agriculture at Rome," in *Document No. 196, United States Senate, 63d Congress, First Session* (Washington, 1913).

INTERNATIONAL INSTITUTE OF SOCIOL'OGY (Fr. *Institut International de Sociologie*). A French scientific society founded in July, 1893. The membership is small and almost entirely confined to Europe. Congresses are held from time to time for the discussion of sociological topics.

INTERNATIONAL LANGUAGE. A phrase applied in the specific sense to languages artificially formed for the purpose of ready communication by persons whose natural language is different. The idea is to do away with the difficulties and irregularities with which historical accidents have encumbered the existing languages and to construct, from old or new materials, a language so simple and regular that any person, regardless of his nationality or degree of intelligence, can acquire it with ease and use it with all the necessary precision. Most of the schemes proposed are intended to serve the purposes of business, travel, and correspondence, and not in any way to displace the existing languages nor, in spite of the efforts of some enthusiasts, to serve as vehicles of literary expression.

When, by the beginning of the seventeenth century, Latin had been given up as the scientific language, scholars were naturally the first to feel a need for an international tongue as a means of intercommunication. So, as early as 1641, a definite attempt was made by Bishop Wilkins to form a scientific language to take the place of Latin. This was a classification of ideas and of words by ideas and a scheme of characters, much like shorthand, to represent them. Leibnitz tried to improve it by making it even more philosophical, and his idea of pasigraphil, or language by signs, is still quoted as a curiosum. All of the fundamental ideas of the modern systems, however, are found in his scheme. Thus, he desired but one declension and one conjugation, both absolutely regular and without exception, complete suppression of the distinction of genders, simplification or suppression of flectional endings in verbs or nouns, etc. With the discovery of the relations of Sanskrit to English in the eighteenth century, thereby instituting the science of comparative philology, efforts at the formation of international languages multiplied rapidly. The first time an attempt was made to form a language a posteriori, i.e., from existing languages and not an independent philosophical scheme, was in 1765 in the famous encyclopædia of Diderot and D'Alembert. The author of this article, Faiguet, Treasurer of France, laid lown the general principles which have been followed to the present day. Of course the disciples of the French Revolution, desirous of reforming everything, did not neglect language. In 1795 Delormel presented his project, which possesses some interesting features. It would be impossible to mention here all the systems created in the nineteenth century, for their number is legion. We should not forget, however, Sudre's *Soldrésol*, or universal musical language. Originally established in 1817, an effort was made by Gajewski in 1902 to revive it. Among other projects that may be considered of importance are those of Grosselin (1836); Schipfer's *Communicationssprache* (1839), the first complete scheme of an a posteriori language; Vidal (1844); De Rudelle's *Pantos-Dimou-Glossa* (1858), an international commercial language; Letellier (1850), whose creation enjoyed considerable popularity for many years; Sotos Ochando (1845); Renouvier (1855); Pirro's *Universal-Sprache* (1868), of which Latin is the basis for the vocabulary; Dyer (1875), originator of the *Lingualumina*, or language of light; Volk and Fuchs's *Weltsprache* (1882); Courtonne's *Langue internationale néolatine* (1885), which furnished Zamenhof with the fundamental idea in his elaboration of Esperanto; Maldant (1887); and Eichhorn (1887). During the past 30 years, on account of the great increase in commercial relations and the development of pacifist ideals, considerable interest has been taken in the subject of international intercourse.

The point of departure of this sudden awakening of interest dates from the publication in 1879 of *Volapük* (q.v.) by Monseigneur Schleyer, which enjoyed the greatest popularity of any international language formed up to that time. As the basis of this project was principally English, nationalist tendencies were at once aroused, and within a few years more than a dozen schemes for international languages were put forth. Some proposed Latin or Greek, which they have sought to adopt to modern requirements, such as the *Novilatiin of Beermann* (1895); others preferred to adopt one of the modern European languages, as, e.g., Novicow, who argues brilliantly in favor of French.

Of all the efforts of this kind in recent years, we are forced by the limits of this article to mention only three or four, which have had the greatest vogue and have therefore been worked out in detail. The first of these is *Volapük,* which is discussed under a separate heading and which has elicited a number of imitations. Among these may be mentionel *Spelin*, invented by Bauer (1888), *Dil* by Fieweger (1893), and *Balta* by Dormoy (1893), all of which represent attempts to perfect Volapük; *Veltparl* and *Dilpok*, creations of Von Arnim (1896) and Marchand (1898) respectively, being simplifications of Volapük; and Mill's *Antivolapük* (1893), which, as its title indicates, is opposed to the artificial universal language. The second is *Bolak*, or the *Blue Language*, widely advertised by its inventor, M. Bollack, a merchant of Paris (1899). The author himself has devoted no less than nine volumes to this ingenious creation. The main defect of Bolak is that, notwithstanding its pretensions for practical purposes, its artificiality and extreme difficulty render it of little practical value. The author makes but little appeal to the intelligence of the learner, whereas the numerous and complicated rules of the grammar and the richness of the vocabulary make such demands on the memory that a complete mastery of the language is almost impossible. One might be inclined to say that M. Bollack has not invented a new language, but a new system of language. According to this system there are two categories of words, those expressing *vague* ideas, i.e., subjective ideas or ideas of relation, and those expressing *precise* ideas, i.e., objective ideas, complete in themselves. In conformity with the general usage of European languages, the first are represented by *motules*, or short words, and the second by granmots, or long words. As in ordinary grammar there are eight parts of speech, so in Bolak there are eight classes of words, to wit: *interjections; mots-cadres*, expressing affirmation, negation, interrogation, and the general ideas of relation; *connectives*, i.e., prepositions and conjunctions; *designatives*, being pronouns and pronominal adjectives; *nouns; verbs; attributives*, or adjectives and participles; and *modificatives*, or qualifying adjectives and gerundives. Each one of these classes of words is distinguished by its *aspect*, i.e., by its length and its form. The motules have from one to three letters, and if they have three letters, they end in a vowel; the granmots contain three or more letters, and if they have three letters, they end in a consonant. Interjections are composed of a single vowel, which, however, may be repeated. Nouns have generally one syllable and begin and end with a consonant. Verbs are formed by adding a vowel to a noun, and therefore consist usually of two syllables. The pronouns are declined in four cases, and the verbs have three moods, with eight tenses in the indicative alone. To show the artificiality of the language, we may quote the rule for comparison of attributives and modificatives, which is entitled the rule of the Marguerite. Thus, the degrees of comparison are indicated by prefixed vowels, used also as interjections, *a* signifying indifference, *o* doubt, *e* exuberance, *i* joy. Hence, *aloved* means the least loved, *oloved*, less loved, *eloved*, more loved, and *iloved*, the most loved.

As for the third language, ***Esperanto*** (q.v.), its great advantage lies in the fact that it makes use as far as possible of our living languages. Taking what is common to all tongues and dropping what is special to any of them, it is quite easily acquired.

Finally the *Idiom Neutral*, which may be said to represent what is best in both Volapük and Esperanto, originated with the Russian engineer Rosenberger (1902), but really is the product of the efforts of a number of enthusiasts. Though it developed out of Volapük, the subordination of grammar to vocabulary is in direct contradiction with the spirit of that language. At the same time it borrows many good principles from Esperanto, as, e.g., the abandonment of the use of purely arbitrary formatives, preferring formatives taken from Latin or English. Thus, *dom*, house, *domi*, houses, the affixed *i* being the sole sign for the plural. The accent always falls on the vowel that precedes the last consonant. There are no articles and no case endings, the genitive and dative relations being expressed by the prepositions *de* and *a* (*de dom*, *a dom*, etc.). The verbs have only a single conjugation and are invariable in number and person. Thus, *mi am*, I love, *il am*, he loves, *mi amav*, I loved, *mi av amed*, I have loved, *mi amero*, I shall love, *vo amerio*, you would love, etc. The passive is formed by means of the corresponding moods and tenses of the verb *esar* (to be), followed by the past participle. The prepositions, conjunctions, etc., are chiefly adopted or adapted from Latin or French. The object of easy intelligibility is thus fairly attained. It is claimed that an educated reader can read the Idiom Neutral almost at sight without the aid of either grammar or dictionary. So much of the text is intelligible on mere inspection that the rest may be inferred.

Americans have always taken an active interest in this movement, and many new languages have been proposed on this side of the water, such as *Ro* by Foster (1910) and *Altutonish* or *Pangerman* by Molee (1911).

In order to promote the use of the Idiom Neutral in international correspondence and commerce, a society entitled the Delegation for the Adoption of an International Auxiliary Language was formed in Paris on Jan. 17, 1901, and many publications have been issued by it. It remains to be seen what effect the present war will have upon this movement, for one of its main principles is the promotion of peace.

All of the literature on the subject up to the time of publication can be found in Couturat and Leau's excellent *Histoire de la langue universelle* (Paris, 1903), which has been translated into English. Among more recent works, consult: Couturat, *Weltsprache und Wissenschaft* (Jena, 1909), translated by F. G. Donnan into English under the title *International Language and Science: Considerations on the Introduction of an International Language into Science*, by L. Couturat, O. Jespersen, R. Lorenz, W. Ostwald, L. Pfandler (London, 1911); Ostwald, *Sprache und Verkehr* (Leipzig, 1911); Novikov, *Le Français, langue internationale de l'Europe* (Paris, 1911); Couturat, *Lingvo internaciona di la delegitaro* (*sistemo Ido*); *angla guidlibreto vidita ed aprobita de la sekretaryi*, by Couturat and Leau (London, 1908); *Les nouvelles langues internationales*, by the same authors (Paris, 1907); Schuchardt, *Rapport sur le mouvement tendant à la création d'une langue auxiliaire internationale artificielle* (ib., 1904). For a good bibliography, consult the *List of Works in the New York Public Library Relating to International and Universal Languages* (New York, 1908). Among periodicals are *Lingvo Internacia* (Paris) and *Progreso* (Paris). For a discussion of the possibility of an artificial language, see Schinz, in the *Revue Philosophique* (ib., July–August, 1905). For the work of the Delegation mentioned above, see *Educational Review* (New York, May, 1907).

INTERNATIONAL LAW. The rules and usages by which sovereign states coincide in regulating, on most issues, their conduct and that of their citizens or subjects in their intercourse or dealings with the governments, citizens, or subjects of other similar states. It is neither solely nor chiefly *international*, for it primarily involves the government of a state and only concerns the nation or individual where statute, governmental decree, or accepted usage makes it the law of the land. And it is not, strictly speaking, *law*—being made up of rules and customs which have no binding force except that of abstract right or justice, policy, tacit acquiescence, or definite treaties or conventions, while some of its widely accepted precepts have never been recognized by certain governments. However, the humanitarian trend of modern thought, the closer relations of alien peoples with each other, the improved methods of communication, the increased regard for the rights of others, the prevailing practice of submitting matters of dispute to arbitration, the voluntary declarations of intention to comply strictly with its rules, and many other causes, have done much to give to international law a binding force which it has not hitherto had, aside from the fear of retaliation, or the pressure exerted by other governments who may deem violations of the rules as hurtful or dangerous to their interests. Nevertheless, in times of war (and under extreme circumstances in times of peace) history has shown that treaties, agreements, and rules of international law are broken without hesitation by states who deem observance of such conventions to be dangerous to their existence or subversive of their serious interests.

The beginnings of international law are doubtless as old as civilization, and even savage tribes have held themselves bound to observe certain formalities in intertribal intercourse. The civilization of antiquity was not calculated to do much in the way of regulating international relations except by special treaties between two adjacent monarchies. As a rule, the states were too large and intercourse too difficult to extend these agreements to many of them. Before the days of railways, telegraphs, and practicable roads it required a number of small, adjacent, independent, civilized states really to develop a system of international rules. Though the Greek states fulfilled these requirements, the character of their civilization and the condition of human thought had not yet developed to a point at which anything approaching a system of rules could be initiated. It therefore fell to the small mediæval states of Italy to begin the work. Their commerce, internal trade, close proximity, jealous rivalries, religious quarrels, and other sources of antagonism combined to invite war, and the practice of employing hired soldiery made war easy—indeed, almost inevitable—on the slightest provocation. The wiser rulers and their advisers often desired to avoid hostilities and, when they had begun, to mitigate their severities as leading to discontent among the people and to revolution. The result was the development, in this collection of miniature states, of the modern system of diplomatic representation and the beginning of international law and comity—the institution of passports, the distinction between armed forces and civilians, the laws of war on land and sea, and even the general idea that states have a mutual interest in the observance of law and order among themselves.

This condition of affairs did not obtain in northern Europe, because there the smaller states were overshadowed by the larger ones, and the rule that "might makes right" was carried out to the detriment of the weaker communities. The brutality of the Netherlands war for independence directed one of the greatest minds of the age towards ameliorating such conditions. This was Huig van Groot, who is best known as Hugo Grotius, the Latinized form of his name. He was a jurist, a dramatist, an historian, and a statesman. In 1604, at the age of 20, he composed a work called *De Jure Prædæ*. The manuscript remained unknown until 1868, when it was discovered and published. It is interesting because it shows the main principles and plan of the first part of his great work *De Jure Belli ac Pacis*, which was not written until 1623–25, while Grotius was an exile in Paris (published in 1625). The success of the latter work was immediate, and his fame as the father of international law—or "law of nations" (*jus gentium*), as he termed it—was secure. Grotius practically exhausted the subject so far as theoretical arguments are concerned, and almost nothing has been added to them by all of his successors. This work came at an opportune time, in the midst of the Thirty Years' War, and had a profound effect upon subsequent events.

Grotius was followed by Pufendorf, who published *De Jure Naturæ et Gentium* in 1672: Leibnitz, *Codex Juris Gentium Diplomaticus* (1693–1700); Van Bynkershoek (who was first to give special treatment to public maritime law), *De Dominio Maris* (1721); Wolff, *Jus Naturæ et Jus Gentium* (1740–49); and Vattel, *Droit des Gens* (1758). The writers upon international law since Vattel are too numerous to mention even the most distinguished of them. For a description and criticism of their work, consult Rivier's sketch in Holtzendorff, *Handbuch der Volkerrechts*, vol. i (Hamburg, 1885; Fr. trans., 1888, vol. i, pp. 351–394). In America the most important work has been done by Kent (1763–1847), Wheaton (1785–1848), Halleck (1817–72), Woolsey (1801–89), Dana (1815–82), Wharton (1820–99), Stockton (1845–), and Moore (1861–). The decisions and opinions of eminent judges as rendered in important cases have added much to the subject—in England, Sir Leoline Jenkins (1623–85), Lord Mansfield (1705–93), and Lord Stowell (1745–1836); in the United States, Chief Justice Marshall (1755–1835) and Justice Story (1779–1845).

The modern method of developing and adjusting the rules of international law is by means of conferences of the Powers. The first of these was at Paris in 1856, and its conclusions, commonly called the Declaration of Paris, formed the first step towards a definition and codification of the rules which has been followed in other conferences at Geneva (q.v.), London, The Hague (q.v.), and elsewhere.

INTERNATIONAL LAW IN GENERAL

Political Aspects. International law deals primarily only with sovereign states which are responsible for the acts of their subdivisions, colonies, and citizens. A sovereign state is also responsible to a certain extent for the actions of dependent states and those over which they have established a protectorate or suzerainty; the degree of responsibility depending upon the character of the dependency, protection, or suzerainty.

A sovereign state is a community of persons or of lesser states which has (*a*) an organized government and is permanently established for a political end, (*b*) is possessed of a definite territory, and (*c*) is independent of any external protection, suzerainty, or control. If these requirements are satisfied, the state exists, whether recognized or not by other sovereign states. Failure to recognize the existence of such a state would be an unfriendly act; but as the recognizing state is sovereign, recognition on its part cannot be exacted except by force.

The form of government is immaterial provided it be effective. But in case of any marked change of form, whether made peacefully or pursuant to a successful war or revolution, it is customary for the other Powers to recognize it officially before beginning or renewing diplomatic relations.

A sovereign state has certain inherent rights, such as (*a*) independence, (*b*) equality as respects other similar states, (*c*) absolute and exclusive jurisdiction over its own territory and over its own citizens when resident therein, (*d*) self-preservation, (*e*) determination of its own form of government, (*f*) freedom of navigation of the high seas (q.v.), etc. From the possession of certain rights by a sovereign state it naturally follows that it must discharge certain duties. Among these are (*a*) respect for the rights of others; (*b*) the maintenance of an orderly and efficient government which will guarantee to other states and their citizens the same privileges and protection which are extended; (*c*) good faith, courtesy, and the recognition of and compliance with the generally accepted rules of international law and comity. The mutual recognition of these rights and duties is the basis of international law.

At one time the rights of sovereign states herein mentioned and some others were regarded as absolute and exclusive of the rights of others, and this view is largely held at present by publicists and statesmen. But the improved means of communication and transportation have so extended commerce and business that the condition of the internal affairs of countries is a matter affecting the interests of the world at large. It is no longer a matter of indifference to nations whether one of them fails to maintain orderly government within its territory or exhibits a succession of short-lived administrations established, maintained, and overthrown by force of arms. Such a condition of affairs is a practical denial to orderly states of the same treatment of the citizens and commerce of those states as they themselves extend. To improve the objectionable conditions and to establish legal and stable government, other states have used force, diplomatic or of arms. Most neutrals suffer during war, nearly all do to some extent, though the gain in some instances is greater than the loss. Those neutrals which conceive an impending war to be hurtful to their interests or dangerous to their well-being have, when possessed of the power, sometimes brought such pressure to bear upon the states desiring to appeal to arms that war has been averted.

These interferences with the internal affairs or generally respected rights of sovereign or semisovereign states constitutes intervention (q.v.), of which Sir William Harcourt says: "It is a high and summary procedure which may sometimes snatch a remedy beyond the reach of law. Nevertheless it must be admitted that in the case of intervention, as in the case of revolution, its essence is illegality, and its justification is its success; of all things, at once the most unjustifiable and the most impolitic is an unsuccessful intervention." While in a measure true, this is an extreme statement from the modern point of view. In both cases the proper basis of justification is the degree of tolerability of the condition which is to be improved, the possibility of success, and a comparison of the results of success with the cost of life, property, etc., entailed by intervention.

Certain states, sovereign in most respects, have never been recognized as belonging to the great international group, chiefly from a lack of effectiveness of their governments, especially as regards protection of foreigners because of wide differences in laws and customs. From this condition Japan has emerged and China is endeavoring to emerge. Existing states of this type are Siam, Abyssinia, etc. Several small states of Europe are called neutralized states because their neutrality has been guaranteed by the Great Powers. Such are Switzerland, Belgium, and Luxemburg. Switzerland and Belgium possess armies, but only for the purpose of internal police and protection against invasion. (For the breach of neutrality in Belgium and Luxemburg in 1914, see WAR IN EUROPE.) Semisovereign states exercise full sovereignty except in certain matters defined by treaty with a Great Power or Powers. Such are Cuba, Panama, Morocco, and Persia. States existing under the protection of Great Powers have a very limited sovereignty. Egypt, Tunis, Zanzibar, and the little republics of Andorra and San Marino are examples.

Sovereign states which have been generally recognized as such are called *de jure* states. While a state is in the process of making by means of war, the revolutionists are called *insurgents* until they have established some form of government and control an area of territory in which they are able to give and do give the same protection to life and property as is afforded under like conditions by the authorities of sovereign states. They may then properly be recognized as *belligerents* and usually are so recognized if they obey the rules of international law. (See BELLIGERENT.) Whether recognized or not, they are *de facto* states. One of the most distinguished examples of a *de facto* state which did not become *de jure* was the Confederate States of America.

Jurisdiction. Since each sovereign state is in theory independent of foreign control, its full jurisdiction extends throughout its own territory and no farther. This territory includes the land and water wholly within its borders, the marginal seas to a distance of 3 miles, also the air above and the earth beneath the areas so defined. Treaty, comity, particular conditions, usage, the power of modern guns, and the development of airships have modified this jurisdiction. Rivers and narrow channels forming natural boundaries are open to the navigation of both states, the actual boundary passing through the centre of the deepest or most practicable channel. In the case of rivers or channels originating in one state and flowing through others, the parts within each state are subject to its full jurisdiction; but comity, usage, and treaty have generally extended the use of the full length of such waterways to peaceful commerce, so that a refusal to permit such use would be regarded as a most unfriendly act. If, however, artificial channels or canals are constructed by a state, it may impose any conditions upon their use that it pleases, provided the improved channel or canal has not closed to use a preëxisting natural one. Bays and indentations of the coast, where the headlands are less than 6 miles apart, are regarded as belonging to a nation's territory; even where the headlands are farther apart, treaty, long-continued exercise of jurisdiction, and special conditions have given a quasi acquiescence in such jurisdiction.

The control of the marginal seas to a distance of 3 miles from the coast is based upon natural right (of self-protection), the possibility of enforcing jurisdiction, and the distance at which guns on ships or on shore could inflict damage. The range of guns has greatly increased since this rule was first generally accepted, and it is now modified. Full jurisdiction within the 3-mile limit remains; beyond that limit the jurisdiction does not extend, but other powers must not carry on operations of war at a distance within the range of their weapons, as such operations might injure neutrals.

There are certain restrictions upon the jurisdiction of states called *servitudes*. These relate chiefly but not necessarily to territorial rights and are almost without exception defined by treaty. Among these are the right of passage through channels or territory; the right to fish in foreign waters, to build a canal in foreign territory; the requirement that a port shall be free of import or export taxes, that certain territory shall remain neutral, that certain places shall not be fortified, etc.

Over the *high seas* (q.v.) no nation has any right of sovereignty. They are free to the commerce and warships of the world. Since all nations have an equal right to their unrestricted use, no nation engaged in war can interfere with, interrupt, or render dangerous the operations of neutral commerce on the high seas when carried on in accordance with international law; nor may neutrals restrict the lawful operations of belligerents.

Merchant ships upon the high seas are subject to the exclusive jurisdiction of the state that issues the evidence of nationality which carries with it the right to fly the national flag. Except in time of war, a merchant vessel of a nation cannot be interfered with by the vessels or forces of another when upon the high seas. While within the territorial waters of a foreign state, such a vessel is subject to all the laws of that state; but the French rules, which exempt a foreign vessel from French jurisdiction unless a crime be committed on board which disturbs the public peace, are becoming widely accepted. Public vessels of a nation are not subject to the jurisdiction of any other state, whether on the high seas or in the territorial waters of that other state. As regards armed vessels, the exemption from jurisdiction is absolute and unqualified, but they must obey the local laws and rules of the port. In certain cases of unarmed vessels satisfactory evidence of their public character may be required. For securing greater safety at sea, certain international rules (see RULES OF THE ROAD AT SEA) for the navigation of vessels have been adopted. These must be rigorously obeyed by all vessels, public and private.

The art of aviation has brought about a new condition of affairs as regards the jurisdiction of the air and has rendered a definition of that jurisdiction of greatly increased importance. As the questions involved chiefly concern operations of war, the subject is treated under that head.

The jurisdiction of a sovereign state over its citizens or subjects is absolute when they are within its borders. When they are abroad, its jurisdiction is modified and subject to consideration of the sovereignty of the country in which they are located or traveling. Resident aliens and aliens traveling in a country are subject in all respects to its laws unless these laws are modified by treaty or usage when applied to aliens. Subjection to local laws implies access to local courts. Protection to aliens in peaceful and legal vocations or business is guaranteed, and this protection is practically the same as that given to resident citizens. But aliens may be excluded from the whole or from any part of the territory of a state. Aliens cannot be forced to enter the military or naval establishment of a country unless born and resident within that country, in which case the question of their status is not well defined and the usage is not uniform.

Citizens of a state resident or traveling abroad are entitled to the protection of their own government against unjust treatment, from arbitrary acts of oppression, or deprivation of rights or property, but not against penalties incurred by infraction of the laws of the country in which they may be. They cannot, however, expect a more favorable treatment than citizens or subjects of the country. See ALIEN.

A diplomatic officer resident or traveling abroad is entitled to certain immunities from foreign jurisdiction. These include inviolability of his person and of his official residence and offices, exemption from civil and commercial jurisdiction (local police regulations, customs duties and taxes, religious regulations, etc.), and general exercise of authority over his official suite and his immediate family. Consuls are not diplomatic agents and do not possess these immunities. Their official papers are, however, exempt from seizure, and comity and convention have considerably extended their privileges. As officers of foreign states, international comity requires that certain consideration be shown them and that they should not be required to perform any duty or be subject to any treatment which will interfere with the proper discharge of their legitimate functions, so long as they conform with the local laws and treaty obligations. See DIPLOMATIC AGENTS; CONSUL, MERCANTILE.

Treaties. Treaties are contracts between states. They are not international law, though such of their provisions as receive general acceptance may become so. If any article of a treaty should contravene a well-established rule of international law, it would certainly be held as void by all but the contracting parties. See TREATY.

Measures Short of War. These include all measures for exerting pressure upon an offending state without declaring war. They are usually divided into two classes, retorsions and reprisals.

Retorsions are retaliations in kind. When any state has done certain acts which are regarded by another as prejudicial to its interests, it may retaliate by doing the same acts. Restrictions upon trade or commerce are frequently thus replied to.

Reprisals are any measures taken for the purpose of forcing an offending state to comply with its obligations or as a means of retaliation—these measures being taken without intending to declare or bring on war, though in many cases they do lead to a declaration of it by the other state. The following are some of the common forms of reprisal: (*a*) laying of special duties or taxes upon the commerce or domiciled citizens of the offending state (this is reprisal if it is not a retaliation in kind); (*b*) withdrawal or suspension of rights or privileges of such domiciled citizens; (*c*) sequestration or seizure of property of the offending state or of its citizens; (*d*) suspension of treaties or of certain parts of treaties; (*e*) suspension of commercial or other intercourse, partial or complete; (*f*) pacific blockade; (*g*) partial or temporary occupation of territory. See REPRISAL; RETORSION.

INTERNATIONAL LAW IN WAR

War is a contest between the armed forces of states. Revolutions or insurrections become war when the insurgents are recognized as belligerents. (See WAR.) These forces may operate on land, on the sea, under the surface of the sea, or in the air. The right to make war is one of the attributes of sovereignty and is theoretically defensible on the grounds of self-protection or self-interest.

When war has been declared, or has been recognized as existing, the relations of states to each are profoundly modified or changed. The contending parties become *belligerents* (see BELLIGERENT), and other states are known as neutrals. Formerly the citizens of opposing belligerent states were one and all held to be enemies, though this view is now greatly modified, as will be hereinafter explained. Treaties existing between belligerents are usually abrogated or suspended during war except as regards articles concerning the conduct of war. Treaties to which neutrals and belligerents are parties are modified to conform to existing conditions or suspended.

The possible area over which warlike operations are permissible are the territories of the belligerent states and the high seas. By agreement, voluntary declaration, or through the coercion of other powers, the area of operations may be confined to a particular district or locality.

War may begin by hostile acts of states or a definite declaration or statement. The Second Hague Conference adopted the following rules as to the commencement of hostilities, and these were ratified by nearly all the Powers: "Art. I. The contracting powers recognize that hostilities between them must not commence without a previous and unequivocal warning, which shall take the form either of a declaration of war, giving reasons, or of an ultimatum with a conditional declaration of war.

"Art. II. The state of war should be notified to the neutral powers without delay, and shall not take effect in regard to them until after the receipt of a notification. Nevertheless, neutral powers cannot plead the absence of notification if it be established beyond doubt that they were in fact aware of the state of war."

Notwithstanding these rules the lack of inherent force in international law will probably lead to direct violation or evasion by subterfuge if a state considers its interests too deeply concerned to comply with its provisions. This is due in part to the rapidity with which modern troops and fleets may be mobilized and moved and the disastrous effects of delay or the great gains to be effected thereby. In the condition of affairs which commonly exists just previous to the outbreak of war the actions of both states or of their forces can be made an excuse for almost any proceedings short of general hostilities. The mobilization of the land or naval forces of a state for which no satisfactory explanation is given may be, and usually is, regarded as a hostile act by a possible adversary, and this act becomes still more hostile if the troops be directed towards or concentrate upon the frontier of this adversary. The invasion of the territory of another state is considered an act of war.

Land Warfare. The armed forces of a country consist of its army and navy. The Hague Convention of 1907 provides:

"Art. I. The laws, the rights, and the duties of war apply not only to the army but also to militia and volunteer organizations combining the following conditions: 1. Having at their head a person who is responsible for his subordinates. 2. Having a permanent distinctive sign, recognizable at a distance. 3. Openly bearing arms. 4. Conforming to the laws and customs of war in their operations. In countries where the militia or volunteer organizations constitute or form part of the army, they are comprised under the denomination of army.

"Art. II. The inhabitants of an unoccupied territory who, on the approach of an enemy, spontaneously take up arms in order to repel the invading troops, without having had time to organize in accordance with Article I, shall be considered as belligerents if they bear arms openly and respect the laws and customs of warfare."

Noncombatants are of two classes: (*a*) unarmed citizens or residents engaged in peaceful pursuits; (*b*) unarmed persons performing duties with the army or navy, but not part of the fighting force of an army or part of the crew of a vessel of war. The latter may be held as prisoners of war, the former may not, though any person possessing information, of which the dissemination might be detrimental to the interests of a belligerent, may be temporarily detained if captured within a belligerent's jurisdiction. Noncombatants of the first class are entitled to the protection of the enemy's troops, as regards life, liberty, property, and occupation, as far as is practicable. (*Hague Conv.*, 1907.)

Enemy's troops which surrender or are captured are prisoners of war. An offer to surrender must be accepted. Prisoners of war must be treated humanely and have the same food, bed, and clothing as the troops of the captor. Their personal belongings, except arms, horses, and military papers, remain their property. They are not to be confined except in case of necessity. They may be employed on work not connected with war operations; but if so, they must be paid. Expenses of maintenance of prisoners are to be repaid by their governments at the close of the war. A bureau of information regarding prisoners of war must be established, and it shall be furnished with all information concerning them and keep all papers, valuables, etc., found on the field of battle or left behind by prisoners who escape, are paroled, exchanged, etc. Prisoners may be given disciplinary punishment for attempting to escape or for insubordination or infraction of the rules established for their government. Parole, which is an engagement not to bear arms against the captor during the continuance of hostilities unless duly exchanged, may be accepted from prisoners, but they cannot be forced to give it. Breach of parole is punishable by a military court. Persons who follow an army but are not connected with it, such as newspaper correspondents, sutlers, furnishers of supplies, etc., if held by the captor shall be treated as prisoners of war. In regard to the wills, death certificates, burial, etc., the same rules are followed as for soldiers of the captor's army. Sick and wounded are to be cared for in accordance with rules of the Geneva Convention (q.v.). (*Hague Conv.*, 1907.)

Belligerents are forbidden: (*a*) to use poison or poisoned weapons; (*b*) to kill or wound through treachery or after an enemy has laid down his arms and surrendered; (*c*) to declare that no quarter will be given; (*d*) to employ weapons, projectiles, or substances of such a nature as to cause unnecessary pain; (*e*) to make improper use of the flag of truce, national flag, insignia and uniform of the enemy, or distinctive signs of the Geneva Convention; (*f*) to seize or destroy enemy's property except when actually necessary; (*g*) to declare extinguished, suspended, or barred the rights and choses in action of the nationals of the adversary; (*h*) to compel the nationals of the adversary to take part in military operations against their country, even if in the service of the captor before the commencement of the war; (*i*) to bombard undefended cities, villages, dwellings, or buildings; to give up a city or place to pillage, sack, or plunder even if taken by assault. (*Hague Conv.*, 1907.)

Stratagems and other means to obtain information concerning the enemy and the topography of the country are permissible. Before beginning a bombardment, the commander of the attacking force shall give warning if possible except in case of attack by main force. During sieges and bombardments buildings devoted to the care of the sick and wounded, religious worship, art, science, charity, and historical buildings and monuments will be spared as far as practicable if not used for a military purpose. These buildings shall be distinguished by the besieged by visible signs and the besieger informed of their character. (*Hague Conv.*, 1907.)

A spy is a person who attempts to get military information for the use of the enemy in a clandestine manner and by deception. Undisguised soldiers are not spies; nor are undisguised soldiers or civilians openly performing their duties, even if carrying dispatches. A spy caught in the act must not be punished without trial. A spy who escapes and rejoins his own army cannot, if recaptured, be punished for his offense.

Flags are carried to indicate the nationality of the troops to enemy and friend alike and for other purposes. The flag of truce (q.v.) is used to ask for a parley. A white flag is sometimes used as a sign of surrender.

Capitulations must take into account the rules of military honor and be agreed upon. An armistice (q.v.) suspends military operations by the parties to it over the territory and during the period agreed upon. Serious violations give the right to denounce it and resume hostilities; violation of clauses by individuals requires only their punishment.

A territory is considered as being occupied when actually under the authority of the hostile army and where that authority is capable of being exerted. The occupant shall take all measures necessary to restore and preserve order, life, property, and the rights to religious convictions and religious worship. Private property cannot be confiscated or taken except for public use, and then it must be paid for; looting is forbidden. Taxes, duties, and tolls may be collected for defraying the expenses of administration, but they should be laid and collected as nearly as practicable in accordance with previous custom. If other taxes are laid or contributions collected, they must be for the needs of the army or administration. All taxes must be established pursuant to a written order issued under authority of the commander in chief, and a receipt be given for all payments. Requisitions in kind and services can duly be levied for the needs of the army. Supplies must be paid for in cash as far as possible, a receipt given for the remainder, and the amounts due paid as soon as possible.

An army occupying a territory may seize only the specie, funds, collectible securities, arms, munitions of war, and other movable property of the state capable of being used in military operations. Private property, such as means of communication, transportation, munitions of war, etc., may be seized, but the owners must be indemnified for their use. Submarine cables connecting an "occupied" territory with a neutral territory shall not be seized or destroyed except in case of absolute necessity. If injured, they must be restored and the indemnities adjusted upon the conclusion of peace. Public buildings, real estate, and other fixed property of the state may be occupied by the captor as a usufructuary. The property of communes and of institutions devoted to religious worship, charity, instruction, or to arts and sciences, even when belonging to the government, shall be treated as private property. Seizure or destruction of such institutions, or historical monuments, or works of art or science is prohibited. (*Hague Conv.*, 1907.)

War on the Sea. The naval forces of a state comprise the regular navy, the naval reserve, naval militia, volunteers, and others taken into the public service. While privateers are still permissible under international law, it is not likely that they will again be used by a great naval power.

The rules for land warfare already cited also govern naval warfare so far as they are applicable. The area in which naval operations may take place comprises the high seas and the territorial waters of the belligerents. The objects sought in naval warfare are the capture and destruction of the naval and military forces of the enemy, of various naval and military establishments, and of his maritime commerce; also to aid military operations and defend the national territory, property, and sea-borne commerce.

Public vessels of the enemy may be captured outside of neutral waters; their officers and crews become prisoners of war, except those which are exempted by the Geneva Convention. The vessel itself is a prize of war, no prize-court proceedings being necessary. Vessels owned by private citizens of belligerent states are subject to capture as enemy property when outside of neutral water, though the United States has always striven to make it a rule of international law that private property not contraband of war be exempt from capture. After a merchant vessel is captured she must be turned over to the jurisdiction of a prize court (q.v.) to determine the validity of the act, or she may give a ransom bond. (See RANSOM.) Belligerent vessels of war have the right to search all private vessels, belligerent or neutral, in order to determine their nationality and whether they are subject to capture or not. Neutral vessels may be captured and condemned as prizes for the following offenses: (*a*) carrying contraband of war to a port of the enemy; (*b*) entering or attempting to enter a blockaded port; (*c*) unneutral service; (*d*) forcible resistance to stoppage or search.

Neutral trade with the enemy is permitted in ports not blockaded provided the neutral vessels do not carry goods which are contraband of war. All goods may be divided into three classes, viz., (*a*) *contraband*, which are useful solely for war purposes, such as arms, ammunition, etc.; (*b*) *conditional contraband*, which are used for both war and peaceful purposes, such as coal, oil, provisions, money, etc.; (*c*) free goods, which are used only for peaceful purposes, such as raw materials, machinery necessary for agriculture and mining, furniture, etc. While the provisions of the Declaration of London have not been universally agreed to, its terms are in accordance with the generally accepted rules of international law, so that its definite lists of contraband, conditional contraband, and free goods are likely to guide the decisions of future prize courts (q.v.). (*Decl. of London*, 1909.)

Though the United States has always striven to secure the exemption of private property from capture, the rule has not yet been adopted. Enemy's goods on an enemy's vessel are subject to capture and condemnation, but enemy's goods on a neutral vessel are not subject to condemnation, nor are neutral goods on an enemy's vessel. (*Decl. of Paris*, 1856.)

Blockades (see BLOCKADE) may be either on the sea or on land and may be military, naval, or commercial. Most sea blockades are both naval and commercial. The following remarks apply to commercial blockades:

A (commercial) blockade is the investment of the coast or a portion of the coast by a naval force in such a manner as to prevent vessels from entering or leaving any port in the blockaded area without imminent danger of capture. Blockades must be established by proclamation to all states and to the local authorities, and a reasonable time allowed for neutrals to receive the information. Breach of blockade by a neutral merchant vessel renders her liable to capture and condemnation as a lawful prize. But if the vessel escapes to her destination, she is not afterward liable for her act. The cargo of a vessel condemned for breach of blockade is also subject to condemnation. All private vessels, whether belonging to a neutral or the enemy, should be turned over to a prize court for adjudication, but in very exceptional cases they may be destroyed. (*Decl. of London*, 1909.)

Submarine mines may be laid in any belligerent waters by either belligerent for the purpose of destroying the war vessels of the enemy, but not for the purpose of intercepting commercial shipping, though certain channels to a harbor may be closed by mines, hulks, or any form of obstruction. (*Hague Conv.*, 1907.)

In regard to automatic submarine contact mines The Hague Convention of 1907 provides:

"Art. I. It is forbidden:

"1. To lay unanchored automatic contact mines, except when they are so constructed as to become harmless one hour after the person who laid them ceases to control them.

"2. To lay anchored automatic contact mines which do not become harmless as soon as they have broken loose from their moorings.

"3. To use torpedoes which do not become harmless when they have missed their mark.

"Art. II. It is forbidden to lay automatic contact mines off the coast and ports of the enemy, with the sole object of intercepting commercial shipping."

Another article provides that every precaution must be taken for the security of peaceful shipping and to notify neutrals of danger zones when the mines are no longer under surveillance. At the close of hostilities all existing mines must be removed by the state which placed them.

Unneutral Service. Unneutral service includes all acts by a neutral vessel, knowingly performed, which give aid to the enemy or assist him in carrying on the war. These include the carrying of troops or dispatches (not in the ordinary closed mails), or supplies for the enemy; or being in the exclusive employment of the enemy's government; or being under orders or control of an agent placed on board by that government; or taking an active part in the hostilities. Neutral vessels performing any of the services mentioned in the foregoing are therefore liable to capture and condemnation as lawful prizes.

Neutral States during War. It is the right of a state to remain neutral during war. It is its duty to observe that neutrality in its actions affecting belligerents. It is customary for the head of a neutral state to issue a proclamation of neutrality, informing its people of the existing war and cautioning them as to the obligations of neutrals and the penalties for breach of such obligations.

Neutral states must not (*a*) permit the use of their territory by belligerents or (*b*) aid belligerents in their operations. This aid includes the equipment and construction of vessels of war. But a neutral power is not called upon to prevent the export or transport, on the part of one or other of the belligerents, of arms, munitions of war, or, in general, of anything which can be of use to an army or a fleet. (*Decl. of London*, 1909.)

The fact of a neutral power resisting, even by force, attempts to violate its neutrality cannot be regarded as a hostile act. (*Hague Conv.*, 1907.)

A neutral power is not called upon to forbid or restrict the use on behalf of the belligerents of telephone or telegraph cables or of wireless telegraph apparatus belonging to it or to companies or private individuals, or even to a belligerent, if erected before the beginning of hostilities and if it is open to all public messages. But a neutral power may restrict the use of these methods of communication provided the restriction is applied impartially to both belligerents. (*Hague Conv.*, 1907.)

The transfer of a merchant vessel to a neutral flag must not be made for the sole purpose of evading capture as an enemy's ship. In order to be valid it must be unconditional, complete, and in conformity with the laws of the countries concerned, and in such manner that neither its control nor the profits of its employment shall remain in the same hands as before the transfer. If the transfer takes place 60 days before the outbreak of hostilities, the transfer is regarded as valid unless it can be proved that it was simply for the purpose of avoiding possible capture. If the vessel lost her belligerent nationality less than 60 days before hostilities began, and if the bill of sale is not on board, her capture gives no right to damages. Transfer to a neutral flag after the outbreak of hostilities is void unless it is proved that the transfer was not made in order to evade the consequences to which an enemy's vessel, as such, is exposed. There is absolute presumption that such transfer is void (1) if the transfer has been made during a voyage or in a blockaded port, or (2) if a right to repurchase or recover the vessel is reserved to the vendor, or (3) if the requirements of the municipal law governing the right to fly the flag under which the vessel is sailing have not been fulfilled. Consult Articles 55 and 56 of the *Declaration of London*.

Neutral states must not, in the absence of their own legislation to the contrary, permit belligerent war vessels to remain in one of their ports more than 24 hours, except on account of damage or stress of weather. If the war vessel refuses to go, it may be seized and with its officers and crew interned and held until the war is over. (*Decl. of London*, 1909.)

A belligerent vessel of war may only take, in a neutral port, sufficient supplies of fuel and provisions to enable it to reach a port of its own country. A prize may be brought into a neutral port, on account of unseaworthiness, stress of weather, or want of fuel or provisions, but must leave as soon as the circumstances justifying its entry are at an end. If it does not, and refuses to leave, the neutral power must seize it, release its officers and crew, and intern the prize crew. (*Decl. of London*, 1909.)

Airships in War. As regards aviation, airships, and aërial war, no rules of importance have yet received international sanction; but many separate rules have been proposed, and many authorities have written on the subject. The consensus of opinion seems to be that: (*a*) the air above the territory of a country and of its territorial waters is under the exclusive jurisdiction of that country; (*b*) the air above neutral territory is neutral and not to be entered by belligerent airships without the consent of the neutral state beneath it, except through stress of weather, injury to machinery, lack of fuel to reach its own territory, etc.; (*c*) neutral states must not allow their territory or territorial waters to be used by belligerent airships in any manner which may assist their operation; (*d*) a belligerent state may make such rules as regards neutral aircraft entering its jurisdiction (see rule (*a*) above) as it may deem necessary for its own protection; (*e*) belligerent states may exclude neutral airships from the theatre of war to prevent disclosure of their movements to the enemy, whether this be their own territory, that of the enemy, or of a third power; (*f*) if a neutral airship is engaged in unneutral service, it may be captured if within territory (land or sea) in which such captures can be made and the facts submitted to a prize court for adjudication; (*g*) in case of capture of a neutral airship engaged in unneutral service its crew may be held as prisoners of war to prevent disclosure (to the enemy) of the information that may have been gained; (*h*) neutral airships communicating with besieged, invested, or blockaded places are liable to confiscation for breach of blockade, and the crew held as prisoners of war.

By declaration of the Second Hague Conference of 1907 it is prohibited to discharge projectiles and explosives from balloons or by other new methods of a similar nature. But public opinion has changed since that time, and in the great European War of 1914 both sides used aërial craft for bomb-dropping purposes.

It is manifest that airships should carry means of establishing their nationality, and that they should exhibit some distinguishing mark the absence of which would be evidence of unfriendliness; otherwise neutral or friendly airships might be destroyed by their friends.

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The Hague Peace Conference of 1907 and The London Naval Conference of 1909 cover in a general way nearly the whole field of international law as regards war. The Hague Conference adopted a series of conventions on the following-named subjects: (*a*) pacific settlement of international disputes; (*b*) respecting the limitations of the employment of force for the recovery of contract debts; (*c*) relative to the opening of hostilities; (*d*) respecting the laws and customs of war on land; (*e*) respecting the rights and duties of neutral powers and persons in case of war on land; (*f*) relative to the laying of automatic submarine contact mines; (*g*) respecting bombardment by naval forces in time of war; (*h*) adaptation to naval warfare of the principles of the Geneva Convention; (*i*) relative to certain restrictions with regard to the exercise of the right of capture in naval war; (*k*) concerning the rights and duties of neutral powers in naval war; (*l*) relative to the status of enemy merchant ships at the outbreak of hostilities; (*m*) relative to the conversion of merchant ships into warships; (*n*) relative to the creation of an international prize court. The Conference issued a declaration prohibiting the discharge of projectiles and explosives from balloons (and by inference from all aircraft), and it formulated an opinion and prepared a draft of a convention relative to the creation of a judicial arbitration court. Not all the conventions have been ratified by the Powers, nor were all signed by the delegates of every Power. Convention (*k*) was not ratified by the United States as regards one article; and conventions (*l*), (*m*), and (*n*) were not signed by the United States delegates and not ratified by the United States. The London Naval Conference of 1909 formulated the so-called "Declaration of London, 1909." This has not been ratified by the United States on account of some of its provisions. Nevertheless, it expresses, with a few exceptions, the generally accepted principles of international law as regards naval war with an authority far beyond that of occasional decisions by judges or of the opinions of the most distinguished international law writers. Full reports of these conferences may be found in the annual publications of the United States Naval War College for the years 1907 and 1908; The Hague Conferences of 1899 and 1907 are given by Higgins (see foregoing references) and by James Brown Scott (*The Hague Peace Conferences of 1899 and 1907*, 2 vols., Baltimore, 1909). See ALABAMA CLAIMS; CONQUEST; CONFLICT OF LAWS; EXTRADITION; HOSPITAL SHIP; PIRACY.

INTERNATIONAL PEACE CONFERENCE. See PEACE MOVEMENT.

INTERNATIONAL PEACE MOVEMENT. See PEACE MOVEMENT.

INTERNATIONAL PHOTOGRAPHIC CHART OF THE HEAVENS. See ASTROPHOTOGRAPHY.

INTERNATIONAL PRISON CONGRESS. The first prison conference was held in 1845 at Frankfort, followed by a second in 1857. These were largely attended by Europeans. After this, local associations were formed, but no international convention held. Count Sollenhub, of Russia, suggested to Dr. E. C. Wines, Secretary of the New York State Board of Charities, that the board call a congress. This was not deemed advisable, but shortly thereafter (1870) the first American prison congress was held, and President Grant was influenced to appoint Dr. Wines commissioner to arrange an international conference. The congress met in London in 1872. Meetings are now held at intervals of five years, the last having been at Washington in 1910. The programmes are arranged by a permanent committee, the International Prison Commission. The scope of the organization is wider than its name would indicate. All matters pertaining to crime and its repression fall within the field of the congress. At present the organization is divided into four sections: (1) criminal law; (2) prison administration; (3) prevention of crime; (4) crime among children and minors. Consult *Bulletins* and *Reports* of the congress.

INTERNATIONAL TRADE. Trade between nations or between distant regions has been a fruitful source of discussion among economic writers, and a subject which has often engrossed governmental attention to the exclusion of internal commerce, though it is a familiar fact that in modern times internal commerce is far more important to the welfare of the state. This apparently undue prominence in discussion and legislation was due not only to the fact that international trade caught the eye of the observer, while domestic trade withdrew itself from observation, but also to the fact that in early economic life foreign trade, as compared with home trade, was far more significant than it is in modern times.

This greater relative importance of international trade in its historical beginnings was due to the slight division of labor in the older economic order and to the relatively small areas of states. The soil of the neighborhood produced what was necessary for the simple wants of the inhabitants. Towns were rare and small, and artisans few in number. Most of the inhabitants were agriculturists, whose most pressing needs for manufacturing products were satisfied by the produce of the household. In short, the satisfaction of daily wants did not give rise to a "home trade" such as characterizes modern industrial society. To the uniformity of economic organization must be added the difficulty of internal communication as an obstacle to the development of any considerable interchange of commodities. Navigable rivers furnished the only means of internal transportation which were not attended with prohibitive costs. Only those nations with a favorable seacoast could develop any considerable commerce, and with it that diversification of industrial pursuits upon which domestic trade rests. We may therefore say that foreign trade preceded domestic trade.

If we except the period of the Roman Empire, when such trade as existed became internal trade, because the known world became, as it were, one nation, the division of sovereignty before modern times was so great that most trade was foreign rather than domestic. When petty principalities or provinces of the same realm enjoyed their own customs regulations, much trade was "foreign" which in modern times would be domestic.

Largely to these considerations, as well as to the more showy character of foreign trade, its spectacular and romantic character, does this trade owe its prominence in economic discussion and in the attention of governments. Moreover, as such trade came into early notice as a means of raising revenue for the state, it thus became a matter of public concern.

It cannot be claimed that the contradictory and vacillating practice of mediæval rulers developed any well-defined theory of foreign trade. It was not until after the discovery of America and the commercial awakening that followed the influx of the American silver that the beginnings of a theory of trade appear in the writings of pamphleteers who have since been designated as the mercantile school. Thomas Mun, in his work upon *England's Treasure by Foreign Trade* (1664), states in a few words the wisdom of his time. "The ordinary means to encrease our wealth and treasure is by *Forraign Trade*, wherein wee must ever observe this rule: to sell more to strangers yearly than wee consume of theirs in value. By such a course the balance must be paid in coin, and the country enriched, while a contrary course would deplete its stock of the precious metals." The confusion of wealth and money is obvious and characterizes the whole thought of the period. As we shall see, it led to some extraordinary governmental measures to promote the flow of gold and silver into the nation and to check its outflow. It distorted the economic policy of the nations for generations and threw the entire public interest in foreign trade upon its capacity to attract specie. It carried with it the corollary that importations should be limited as far as possible and caused vexatious restrictions, high import duties, and frequent prohibitions of the importation of foreign commodities. Thus, in 1674 the total prohibition of the importation of French brandy was advocated in England, not only to encourage the consumption of domestic ale and beer, but also because it was considered undesirable to increase the consumption of French goods. Writings upon trade subjects are full of fears lest any nation should sell more to England than it bought from her, and the government was repeatedly urged to take measures against any nation which so offended against public policy. All writers did not, however, share this short-sighted view, and Mun stands out from his contemporaries by his perception that what is apparently lost by trade with one nation may be the means of gain, since the goods imported from it may be disposed of at great profit to some other nation. He is none the less quite convinced that the aggregate of exports and imports should show a decided balance in favor of the former. Another characteristic of the time is the preference given to trade in distant parts, as when Mun says: "Also wee ought to esteem and cherish those trades which wee have in remote or far countreys, for besides the encrease of shipping and mariners thereby, the wares also sent thither and received from thence are far more profitable unto the kingdom than by our trades near at hand." The great profits secured by those states which came to be depots of the Indian trade doubtless led Mun to take this view.

To these writers the entire advantage of foreign trade lay in exportation. Importation was at best a necessary evil. So far as individuals were concerned, it is true, the volume of business of both kinds was the measure of profitableness, and traders were prone to encourage all commerce; but from the standpoint of the kingdom as a whole that trade was regarded as profitable which resulted in an importation of specie.

The Physiocrats (q.v.) riddled the pretensions of these writers and held up their policy to derision. Adam Smith demonstrated still more conclusively the weakness of their doctrine. He did not feel it necessary to insist that money and wealth were not synonymous terms, that an increase in the former was not the sole goal of statecraft. In his day England's stock of the precious metals was adequate to its needs and was therefore not an object of peculiar solicitude for the statesman, as it had been in earlier times. Adam Smith states in the following terms the advantages to different countries of international trade: "It carries out that surplus part of the produce of their land and labor for which there is no demand among them, and brings back in return for it something else for which there is a demand. It gives a value to their superfluities, by exchanging them for something else which may satisfy a part of their wants and increase their enjoyments. By means of it the narrowness of the home market does not hinder the division of labor in any particular branch of art or manufacture from being carried to the highest perfection. By opening a more extensive market for whatever part of the produce of their labor may exceed the home consumption, it encourages them to improve its productive powers and to augment its annual produce to the utmost, and thereby to increase the real revenue and wealth of the society." Trade enables a nation not only to obtain what it cannot produce itself, but also to carry its own production to the highest degree of perfection by reason of this outside demand. The advantage of trade lies in its effect upon home industry, and trade is represented as a mutual and not as a one-sided advantage. The home market is now recognized to be the most important, and foreign trade as subsidiary to it, as significant only in so far as it promotes a better division of labor and more productive employment of capital at home. The emphasis is shifted from the purely mercantile side, and the question shown to be a much larger one than a mere increase or decrease of specie.

If the mercantilists insisted that the entire advantage of foreign trade lay in exportation, while Adam Smith deemed the advantage mutual, later writers—as, e.g., John Stuart Mill—have gone so far as to declare that the importance to the nation of its international trade was measured by its imports. This is not, of course, a mere reversal of the mercantilist attitude, for the distinguished economist is far from contemplating the possibility of imports without corresponding exports. But to him the imports of a nation represent a saving of energy, time, labor, and capital in the acquisition of goods. While the same goods, or many of them, could doubtless be produced at home, it would be at far greater expenditure of effort than that involved in producing the goods exported to pay for them. In following the history of economic thought on the subject of trade, we have passed from the period of a crude but ultra protectionism to one of free trade.

In the meantime new questions have arisen which call for attention. It needs no expert to perceive the advantage of trade between temperate and tropical countries. But in the trade of temperate countries among each other the advantage is not so apparent. It may, and does, happen that a country will import from another a commodity which it can produce at home at less labor cost than is expended upon its production in the country whence it is imported. If such is the case, it is clear that production does not always take place at the point of maximum advantage. It is assumed that within a given country production is carried on at the point of greatest advantage, because of the mobility of capital and labor. But between different nations there is not such perfect mobility, and production continues under varying circumstances of advantage and disadvantage. In domestic trade the costs of production, as a rule, determine prices and values; but in international trade there must be another rule. If England can produce a commodity A with 10 units of productive power, while a foreign country requires 12 units for the same commodity, England may buy of the foreign country, but certainly will not pay 12 units for the goods. The first question which arises is, Why does not England in these circumstances produce the commodity A? Simply because in the production of other commodities, B, C, D, etc., it enjoys still greater advantages over foreign countries. Its maximum productivity is gained by concentration on these other lines of production. In the case mentioned the costs of production for England and the foreign country may be stated as follows for like quantities of each commodity:

A. England 10 units, the foreign country 12 units.
B. " 9 " " " " 13 "
C. " 8 " " " " 14 "
D. " 7 " " " " 15 "

It is clear that it will be profitable for England to produce B, C, D for its own wants, and so much in excess thereof as it can persuade the foreign country to take, while it will pay the latter to concentrate its production upon A and supply so far as possible its needs for B, C, and D by importations from England. This shows the motive for an international trade under these circumstances. There is a further question as to the rate at which these articles will be exchanged.

International Values. As in the illustration given it is obvious that England will not pay the foreign country 12 units for A when it can produce A at home for the expenditure of 10 units, the question is how much the foreign country will obtain. If the demand in England for A is equal to the demand of the foreign country for D, the exchange will take place between those commodities. England will get its supply of A at the cost of producing D; the foreign country will get its supply of D at a cost of 12 productive units instead of 15 productive units. The advantages of the trade are obvious, and the total production of the two countries concerned is greatly increased. If there were no demand in the foreign country for D, but on the other hand a large demand for C, the trade might be between those commodities, and the advantage, though less, might still be considerable. These simple illustrations allow us to state the rule of international value. It is that in international trade the price paid for the foreign article does not follow the costs of production of that article in the country in which it is produced, but rather the costs of production of the article exported in exchange for it. This rule is stated only as a tendency. Economists have devoted considerable attention to the actual equation of exchange. A single modification of the foregoing illustration will indicate the infinite variety of circumstances which modify in practice the tendency stated. Let us suppose that England needs a larger quantity of the commodity A than the foreign country does of D. To stimulate the demand for D, it must be offered at a lower price. So that on the new basis by the exchange of the produce of 11 units of productive power the foreign country gains the same goods as before. Its advantage in the acquisition of D is therefore 15 units — 11 units, or 4 units. On the other hand, England has gained a quantity of A corresponding to the expenditure of 9 units of her own productive power; her gain by the exchange is no longer 3 units, but only 2. In this manner an infinite variety of circumstances, such as cost of carriage, customs, exchange, may be introduced to modify the conditions of the problem.

History of International Trade. It has already been pointed out that the earliest trade was between widely distant nations rather than contiguous ones; that in the entire period which preceded the nineteenth century trade between different countries rested upon a pronounced difference in their products, rather than on such slight advantages of comparative cost as in modern times. Fundamental, moreover, for an understanding of the course of earlier trade is a proper appreciation of the costs of carriage and of the legal obstacles to trade imposed by the governments. These considerations affected in a high degree trade by land, and in lesser measure that by sea and along the navigable rivers.

The great physical contrast upon which early trade was founded was that of temperate and tropical countries, which in historic times was the contrast of West and East. This physical contrast was enhanced by a distinct historical development of the two regions, by the earlier progress of civilization and the arts among the people of the Orient. Hence a large part of the history of commerce is the history of trade with the East. The first trade routes were overland from Central Asia to the Mediterranean, whence the goods were carried by Phœnician and later by Greek traders to all parts of the Mediterranean Sea. In view of the heavy costs of transport, the goods which were so traded were of the richer sort—spices, silk, embroideries, fine linens, and the finer manufactures of the metals—sword blades, gold and silver utensils, and precious stones. To the difficulty of transporting the goods was added the difficulty of protecting them, which again forbade the commerce with bulkier commodities, whose size would be an embarrassment. Protected by the power of Imperial Rome, this commerce extended as far as India and China, while Egypt was the granary of the Imperial city.

But with the break up of the Roman power commerce declined. Constantinople, indeed, maintained its relations with the East, and at a later period the Arabs, who controlled the southern Mediterranean from Egypt to Spain and had a firm footing in Sicily, carried on a considerable trade. But the Roman civilization on the Rhine, in Britain, and in Gaul, which had brought those countries into close connection with the Oriental world, had been destroyed, while Goths and Lombards subjected Italy to a ruder civilization than it had heretofore known. It was, however, in the Italian peninsula that commerce first arose in the Middle Ages. Venice, Genoa, Pisa, and Florence took up the trade between the East and the West, which in classic times had been in the hands of Greeks and Phœnicians. They claimed rights of trade in their settlements at Constantinople first with the Byzantine Empire and later, when Constantinople was taken by the Turks, with the Ottoman Empire. They opened trade with the Moslem monarchies of the Levant and through Egypt reached the trade of India and east Asia. These pretensions were supported by the naval power of the state, which protected the ships of its merchants. They carried the produce of the East and of Italy through the Strait of Gibraltar to Flanders and the Hanseatic towns. At the outset of this new development of maritime commerce it was harassed by pirates, but the strong hand of Venice put down this nefarious practice in the Mediterranean Sea, as the Hanseatic League crushed the Danish sea robbers.

With the advent of the Turks in Asia Minor and the final conquest of Constantinople, the old paths to the East were closed and the supremacy of the Italian states was doomed. New paths were sought to the East—Vasco da Gama discovered the passage to India around the Cape of Good Hope, and in a like quest Columbus revealed to Europe the Western Hemisphere. Portugal, Spain, Holland, England, in turn, succeeded to the commercial leadership. Commerce with these distant lands was not made free to all, but given over to the great commercial companies, of which the East India companies of Great Britain and Holland were the most conspicuous for their enduring results, the Mississippi Company in France and the South Sea Company in England most famous for their spectacular failure.

Of the various restrictions upon and encouragements to foreign trade, which little more than a century ago were so generally in vogue, prohibitive import duties, export duties, and export bounties, one only is of far-reaching significance to-day—duties upon imports. For the various questions to which they gave rise in their modern aspects, see COMMERCE; CUSTOMS DUTIES; FREE TRADE; PROTECTION; TARIFF; MERCANTILISM.

Consult: Adam Smith, *Wealth of Nations* (2 vols., Edinburgh, 1776; ed. by Edwin Cannan, 2 vols., London, 1904); J. S. Mill, *Principles of Political Economy* (2 vols., ib., 1848; ed. by Ashley, ib., 1909); J. E. Cairns, *Some Leading Principles in Political Economy Newly Expounded* (New York, 1900); C. F. Bastable, *Theory of International Trade* (4th ed., ib., 1903). The subject of international trade is discussed in all textbooks of economics, for a bibliography of which see POLITICAL ECONOMY.

INTERNATIONAL WORKINGMEN'S ASSOCIATION, often spoken of as The International. An attempt to unite workingmen of all nations into an organization which should have for its purpose the protection, the coöperation, and the complete emancipation of the working classes. It was an international movement in harmony with the growing feeling of solidarity and common interests which was centralizing the national unions during the latter half of the nineteenth century. The founding of the International Workingmen's Association was occasioned by a visit of French workingmen to the International Exhibit in London in 1862. They came in contact with English trade unionists, recognized their common interests, and as a result a meeting of workingmen of all nations was held in London, Sept. 28, 1864. A provisional committee was appointed to draw up a constitution, which was drafted by Marx after Mazzini's ideas had failed to meet with approval. A general council with headquarters in London was appointed. Sixty delegates were present at the first congress in Geneva, in September, 1866, where an eight-hour day was approved and a system of education discussed. At Lausanne in 1867 Socialistic principles were first adopted, with the result that its English adherents, whose ideal was trade unionism, withdrew from the movement. At the third and most important congress at Brussels in 1868 the congress announced itself opposed to war, advocated a general strike in case of war, and declared itself in favor of state ownership of mines, land, and transportation facilities. Bakunin and other anarchists joined the fourth congress at Basel in 1869. In that year the Social Democratic party was founded in Germany, representing in politics the principles of the International. The Franco-Prussian War prevented the meeting of the fifth congress at Paris. In 1872 at The Hague congress the anarchists were expelled, and the general council removed to New York. A last congress, representing chiefly the anarchistic wing of the party, was held at Geneva in 1873. For some years this faction carried on a fiery agitation in the south of Europe, but with the death of Bakunin in 1876 it disintegrated, its members becoming the anarchistic Communists of to-day. The Marxist wing developed in other countries, as well as in Germany, into Social Democratic parties. Branches of both factions were formed in the United States, but were never firmly established. In the American movement the anarchistic faction showed the greater strength. This faction broke up into two rival associations, the International Working People's Association and the International Workmen's Association, the latter representing the more radical principles. While it existed, the International aided strikes of bronze workers in Paris (1867) and builders in Geneva (1868) and supported English trade unionists in their opposition to the importation of cheap labor. A number of journals were devoted to its cause.

Consult: John Rae, *Contemporary Socialism* (2d ed., New York, 1901); J. G. Brooks, *Social Unrest* (ib., 1903); R. T. Ely, *Labor Movement in America* (new ed., ib., 1905); Thomas Kirkup, *Inquiry into Socialism* (3d ed., ib., 1907); id., *History of Socialism* (4th ed., 1909); E. Kelly, *Twentieth Century Socialism* (ib., 1910).

INTERNMENT OF VESSELS. See International Law; Neutral States during War.

IN'TERNODE (Lat. *internodium*, space between knots, from *inter*, between + *nodus*, knot). In botany, the portion of stem between two successive nodes (joints). It is the internodes which give length to the stem and stretch the nodes apart. Among the Pteridophytes the differentiation of the stem into nodes and internodes appears in the Equisetales (q.v.), while it is a feature of all seed plants. This differentiation means the restriction to the nodes of the power of producing lateral members. This gives to nodes a power which is not generally appreciated. The lateral members usually produced are leaves and branches, but if a node is placed in proper relation to the soil it will produce roots also. This means that the power to produce new plants is lodged in the node, and therefore a node is a reproductive structure. The significance of internodes, therefore, is a contributory one, merely spacing the nodes apart, so as to give the lateral members freedom for work and development. See Stem.

IN'TERO'CEAN'IC SHIP CANAL. See Canal; Nicaragua Canal; Panama Canal.

INTEROCEANIC SHIP RAILWAY. See Ship Railway.

IN'TERPAR'LIAMEN'TARY UNION FOR IN'TERNA'TIONAL AR'BITRA'TION. An association of members of the supreme legislative bodies of the world, organized to promote the peaceful settlement of disputes between nations. It grew out of a parliamentary conference held in Paris in 1888. The first regular meeting took place at Paris in 1889. Since that year meetings have been held annually at various cities in Europe and America, excepting in years when, on account of international conflicts, as the Spanish-American and the Russo-Japanese wars, such meetings would have been unlikely to be productive of any results.

Any member of a national parliament or congress is eligible to membership; and a person once chosen a member of the union may retain his membership in that body after his membership in the parliament or congress has terminated. Until 1897 the United States sent no representative to the conference; in recent years, however, the American group in the union has taken a prominent part in its deliberations. It is one of the aims of the union to include in its membership a majority of the members of every national parliament or congress.

The business of the association at each regular meeting is under the general direction of a committee consisting of two delegates from each country. There is also a permanent executive committee which conducts the business of the association when the union is not in session.

At the meeting in 1894 the union declared in favor of a permanent court for international arbitration, and a committee was appointed to elaborate a project to this end. At the meeting in Brussels in 1895 the project of the committee was adopted, and it was then presented by the members of the union to their respective governments. Upon this project The Hague Tribunal, in its main outlines, is based. At the meeting of the union at St. Louis in 1904 resolutions were adopted urging the President of the United States to propose to the Powers the convening of a second peace conference at The Hague, to consider (1) the questions deferred by the first Hague Conference to a later date; (2) the negotiation of permanent arbitration treaties between the various powers; (3) the advisability of establishing a permanent international congress of nations for the purpose of defining the rules of international law. In accordance with the suggestion of the union, the President directed the State Department to address a circular letter, proposing a second peace conference, to the governments signatory to The Hague Convention. At the meeting of the union in Brussels, 1905, the American group proposed the drafting of a model arbitration treaty, to be submitted to the Powers, and a commission was appointed to report on the project. At the meeting of the international council of the union in London in 1906 the form of such a treaty was adopted, amended, at the suggestion of W. J. Bryan, so as to provide that, in case there should arise between nations any disagreement not included in those which under the treaty must be submitted to arbitration, no resort to hostilities shall be had until the parties to the disputes shall have invited the formation of an international commission of inquiry or mediation.

IN'TERPELLA'TION. A method of European legislative procedure, whereby members of the legislature interrogate the ministers in regard to the policy and measures of the government. Its primary purpose is to force the chamber to pass judgment upon the policy of the cabinet. This form of interrogating the ministry occupies an important place in the parliamentary procedure of France and Italy and is also occasionally resorted to in other continental countries of Europe which have a purely parliamentary form of government. Any member of Parliament is free to bring forward an interpellation without regard to the wishes of the ministry. The legislative body fixes the day on which the ministry are to be interpellated on a given subject. The ministers then prepare their answers and make ready for a defense of their policy against the expected attack. Any member may reply to a minister, and a general debate may follow, as well as motions which may result in the resignation of the ministry. In France, of about 20 ministries which have resigned in consequence of an adverse vote in the Chamber of Deputies, 10 have done so on account of motions growing out of interpellations. Interpellations arouse more general interest than the debates on important measures, and one of the chief sources of a minister's strength is his skill in answering them. Ministers are not, however, obliged to answer interpellations when such an answer might prove prejudicial to the public interest, as in the case of diplomatic negotiations. It often happens that the ministry is glad to be interpellated, as a full disclosure of the government's policy may strengthen its position in the estimation of the chambers.

In Italy the method of interpellation exists in substantially the same form as in France. The rules of the Imperial German Reichstag also provide for interpellations; but since the Chancellor, to whom they are in theory addressed, has no seat in the Reichstag and never resigns on account of legislative disapproval, the interpellation is of little significance in German parliamentary procedure.

IN'TERPLEAD'ER. An equitable remedy, available to a person from whom two or more persons claim the same thing, debt, or duty, and who is reasonably in doubt as to which is the rightful claimant. The process was first employed by the courts of common law in England to enable a depositary or bailee of a deed in escrow of whom the grantor and grantee each demanded delivery of the deed (one affirming and the other denying that the conditions of the escrow had been complied with) when sued by either to apply to the court for an order compelling the other claimant to appear and be substituted as defendant in his stead.

It was in the Court of Chancery, however, that the process was developed to cover claims of every nature, where the demands were identical. It became the practice to permit one who was harassed by two claimants demanding the same thing, debt, or duty, to file a bill in equity setting forth the facts and praying that the parties be compelled to interplead, i.e., to contest their claims before the court between themselves, and that the court decree which of them was justly entitled to the matter in controversy. This was permitted irrespective of whether actions had been commenced against the debtor or holder of the property or not. In this form the remedy exists in modern practice. The pleading by which the complainant brings the matter before the court must set forth the following facts: (1) that two or more persons make a claim against him; (2) that they claim the same thing, debt, or duty; (3) that he has no beneficial interest in the thing or obligation claimed; and (4) that he cannot determine without hazard to himself which is the rightful claimant. He must also show by affidavit that he is not in collusion with either party and must allege his willingness to perform his obligation to the proper party. He must therefore be entirely indifferent as to which claimant succeeds—in other words, be in the position of a stakeholder. Very abstruse questions of law often arise as to whether the parties are demanding the performance of the same obligation. For example, if a landlord and a person claiming title from an entirely different and independent source, both demand rent from a tenant, he cannot compel them to interplead, as he is under a duty to his landlord not to dispute his title. However, if a person claims to have derived his title from or through the landlord by purchase or otherwise and both demand rent, the tenant has grounds for relief, as they demand the same obligation, and he does not thereby dispute his landlord's original title.

The relief will not be granted where it appears that the applicant knows or should know which of the claims is just; but if there is a reasonable doubt, and if, with the means of knowledge at his command, he would be running a personal risk to decide between them, it is the settled practice to allow the remedy. See EQUITY; PLEADING; and consult the authorities there cited.

INTER'POLA'TION (Lat. *interpolatio*, from *interpolare*, to alter, from *interpolis*, *interpolus*, altered, from *inter*, between + *polire*, to polish). In mathematics, the process of finding terms intermediate between given terms of a series. From the law of the series the values of the intermediate terms may be computed, but it is often sufficient for practical purposes to approximate the intermediate terms by assuming a simpler relation. For example, given log 80 = 1.9030, and log 90 = 1.9542, the logarithm of 85 is approximately obtained by adding to 1.9031 one-half of the difference between 1.9542 and 1.9031, although the logarithms are in arithmetic progression only when the numbers are in geometric progression. The method of interpolation is not only of use in pure analysis, but it is particularly valuable in problems of astronomy and other sciences, often saving laborious calculation. Thus, the position of the moon for any hour may be determined by interpolation from its computed positions for every 3, 6, or 12 hours, with sufficient accuracy for practical purposes. Methods of interpolation for astronomical problems are found in Lagrange's memoirs of 1783, 1792, 1793. Consult: H. L. Rice, *Theory and Practice of Interpolation* (Lynn, Mass., 1901); C. L. Doolittle, *Treatise on Political Astronomy as Applied to Geodesy and Navigation* (4th ed., New York, 1903); Otto Biermann, *Vorlesungen über Mathematische Näherungsmethoden* (Brunswick, 1905).

INTER'PRETA'TION (Lat. *interpretatio*, explanation, from *interpretari*, to explain, from *interpres*, agent, interpreter), or CONSTRUCTION. The process of ascertaining, subject to the rules of law, the meaning of a speaker or a writer, or of parties to a legal instrument, as expressed in its spoken or written terms. Some authorities distinguish construction from interpretation; using the latter term to describe the process of finding out the true sense of any form of words, and applying the former to the process of ascertaining the legal effect of those words. According to these authorities, "the office of interpretation is analytic, that of construction is synthetic; the office of the one is to get at facts, that of the other to group these facts and determine their legal meaning; interpretation is exploration, construction is induction." Or, to put the distinction in another way, interpretation gives us the grammatical and logical signification of the words and sentences under consideration; while construction gives us their legal effect by "the familiar judicial process of applying the law to the facts of the case." In practice, however, the two terms are usually employed in the same sense, as denoting the process of ascertaining the true import of a document having legal consequences. Interpretation, as a separate branch of law, has its origin in the imperfections of language and the limitations of human understanding. How imperfectly and even bunglingly the average man expresses himself, not only in hurried memoranda, but in formal documents as well, is evidenced by the vast number of lawsuits brought to settle the meaning of such documents.

The legal process of interpretation is required, not only because of confused thinking and the careless use of language on the part of speakers and writers, but because of the frequent misapprehensions of hearers or readers, due to mental limitations. If a writing has legal consequences; e.g., if it is a constitution, or treaty, or statute, a will, a deed, or a contract, or if it contains an attack upon reputation or a right of property, provision is needed and has been made for determining which of various interpretations shall prevail. Speaking generally, that determination rests with a court of justice, in a legal action in which the written or spoken words are properly brought before it. If the form of words whose meaning is in doubt is a public writing, such as a provision of a statute, a treaty, or a constitution, the question of construction belongs exclusively to the judge. If it is a private writing, such as a contract, will, or deed, having peculiar expressions in it which have, in particular places or trades, a known meaning attached to them, it is for the jury to say what the meaning of those expressions is; but it is still the function of the court to construe the instrument after the jury has determined the true meaning of such peculiar expressions. This legal rule is due in part to the fact that in olden times jurors were frequently unable to read or write, but in part also, and perhaps more largely, to considerations of policy. A learned English judge once declared that unless this rule was followed "there would be no certainty in the law; for a misconstruction by the court is the proper subject, by means of a bill of exceptions, of redress in a court of errors; but a misconstruction by the jury cannot be set right at all effectually." While the construction of a writing is ordinarily for the judge and not for the jury, libel cases form an exception to the rule. Whether a particular writing is such an attack upon reputation as to amount to a libel is for the jury to decide. In other words, the jury, and not the court, construe a writing which is alleged to be defamatory. Such at least is the doctrine at present followed in England in all cases of defamation, and in the United States in all criminal prosecutions for libel.

It is to be borne in mind that the object of interpretation is not to discover the intention of parties to a transaction by the use of any and every legitimate means. Its purpose is much more restricted. The problem for the interpreter is this: given certain language in which persons have professed to state their intention in a particular matter, what is the intention thus stated? It may be that the parties have used language so carelessly that it fails to express any definite intention. In such a case interpretation is fruitless. It must stop short of accomplishing its object for want of materials. "All latitude of construction," said Chief Baron Eyre in an oft-quoted decision, "must submit to this restriction; namely, *that the words may bear the sense* which by construction is put upon them. If we step beyond this law, we no longer construe men's deeds, but make deeds for them." It is not the office of interpretation, then, to add anything to the text of a writing. Its function is only to discover and set forth what is in it. But a question arises at this point, upon which the authorities are not entirely in accord: What is to be deemed within and what without the text? It is sometimes said that judges and writers in answering this question range themselves in two schools of interpreters—a liberal and a literal school. The former declare that everything is in the text which a mind fully informed as to the circumstances in which the writing was made, "and doing no violence to the rules of language and the rules of construction, may reasonably find there." The latter insist upon limiting interpretation to the meaning of the text itself. Perhaps no better statement of the prevailing view on this point has been made than the following: "Interpretation is a process of reasoning from probabilities, a process of remedying by a sort of equitable jurisdiction the imperfections of human language and powers of using language, a process whose limits are necessarily indefinite, and yet continually requiring to be practically determined. It is not a mere operation requiring the use of grammar and dictionaries, a mere inquiry into the meaning of words."

So far as legal interpretation does make use of the rules of grammar and the laws of language, it does not differ from the process employed by every educated and intelligent listener or reader when engaged in discovering the meaning of a speaker or writer. But when this simple process does not suffice, the courts proceed under rules which have been laid down in the long course of judicial interpretation. Some of these rules owe their existence to peculiarities of legal procedure; but most of them have been evolved by the courts with a view to producing greater uniformity in the terms of legal writings, or to lessening and shortening litigation, or to securing consistency in the judicial process of construction.

The more important of these rules are as follows: 1. When the language of a writing is plain and unequivocal, there is no occasion for interpretation. Even though the court may believe that the language employed does not express the intent of the writer, it will not force upon words a meaning which they cannot fairly bear. When words admit of but one meaning, to put another upon them is not to construe a writing, but to alter it. In case of a statute it is not to interpret a law, but to make one. 2. The grammatical and ordinary sense of words is to be adhered to, unless that would lead to some absurdity, or some repugnance or inconsistency with the rest of the instrument, in which case the grammatical and ordinary sense of the words must be modified so far as may be necessary to avoid that absurdity or inconsistency but no further. Eminent English judges have called this the golden rule of construction. It is a corollary from this rule that when it appears, either from the instrument itself or from the circumstances attending its origin, that certain words are used in an abnormal or peculiar or technical sense, they shall be interpreted in such sense. 3. In construing any part of a writing regard should be had to the entire instrument. Other portions may throw much light upon the one under special investigation and greatly modify the meaning which it would bear as an independent clause. Every part of a writing should be brought into action in order to collect from the whole one uniform and consistent purpose, if that is possible. Accordingly, if one construction will give reasonable effect to every part of an instrument, while another would require the rejection of a part, the former will be preferred. 4. In the case of private writings, such as contracts and deeds, the language is to be construed most strongly against the party who is responsible for its use. Of course, this applies only to cases of ambiguity either in the words themselves or in their legal effect. Even then it will be applied only when other rules of construction fail, for it is deemed somewhat harsh and rigorous. 5. As between constructions otherwise equally balanced, preference is to be given to that which renders the instrument most fair and just and reasonable. 6. In construing doubtful language, the court is entitled to consider all the circumstances connected with the origin of the instrument. Proof of these circumstances is not excluded by any rule of evidence (q.v.). It is not offered to contradict or vary an instrument, but to put the court as nearly as possible in the place of the parties at the time they agreed upon this language as the formal expression of their intentions. 7. The construction put upon an ambiguous instrument by the acts of the parties is entitled to great weight.

The literature of the subject is extensive.

Bibliography. The best theoretical treatment of the subject is found in F. V. Hawkins, *Principles of Legal Interpretation* (London, 1860); Lieber, *Legal and Political Hermeneutics* (ed. by Hammond, St. Louis, 1880); J. B. Thayer, *Preliminary Treatise on Evidence* (Boston, 1898). Among the latest and most valuable practical treatises are the following: Wigram and O'Hara, *Interpretation of Wills* (New York, 1872); Theodore Sedgwick, *Statutory and Constitutional Law* (ib., 1874); F. V. Hawkins, *Interpretation of Wills* (Philadelphia, 1885); L. A. Jones, *Construction of Commercial and Trade Contracts* (New York, 1886); Elphinstone, Norton and Clark, *Rules for the Interpretation of Deeds* (Philadelphia, 1889); J. G. Sutherland, *Statutes and Statutory Construction* (Chicago, 1891); Henry Hardcastle, *Rules which Govern the Construction and Effect of Statutory Law* (London, 1900); Sir P. B. Maxwell, *Interpretation of Statutes* (4th ed., Toronto, 1905); Edward Beal, *Cardinal Rules of Legal Interpretation* (Boston, 1908); H. C. Black, *Handbook on the Construction and Interpretation of Laws* (2d ed., St. Paul, 1911).

INTER'PRETER, Mr. A character in Bunyan's *Pilgrim's Progress*, typifying the Holy Spirit.

IN'TERRA'CIAL MARRIAGE. See Cross Breeding in Man.

IN'TERREG'NUM (Lat., period between reigns), The Great. The name given to the period of German history between the death of Conrad IV, in 1254, and the election of Rudolph of Hapsburg, in 1273. It is often called the age of "fist law" (*Faustrecht*). During this time Germany had no ruler who was generally recognized. William of Holland had been elected as an antiking, in 1247, by the opponents of Frederick II (q.v.). After Conrad's death William, with the aid of the confederation of Rhenish cities, succeeded in restoring order in a portion of Germany. His death, in 1256, led to greater confusion. Some of the electors, in 1257, chose Richard of Cornwall, the brother of Henry III of England; the other electors chose Alfonso X of Castile. Richard spent but little time in Germany; Alfonso never visited it. Neither one acquired any real power, and neither was crowned Emperor at Rome. When Richard died, in 1272, Alfonso's claims were set aside by common consent, and the Pope ordered the electors to proceed to a new election. This resulted (1273) in the choice of Rudolph. One of his first acts was to annul all laws passed by the rival kings since the death of Frederick II, in 1250. For this reason the Great Interregnum is sometimes made to include the years between 1250 and 1273. Consult Kempf, *Geschichte des deutschen Reiches während des grossen Interregnums* (Würzburg, 1893).

IN'TERROG'ATORIES (from Lat. *interrogatorius*, consisting of questions, from *interrogare*, to question, from *inter*, between + *rogare*, to ask). Questions in writing prepared for the examination of one or more witnesses in a judicial proceeding, to be taken out of court.

In the English and American law interrogatories are commonly employed in the following classes of cases: where the testimony of an aged or infirm witness is to be taken before trial, in order that it may be available in case of his death; where a witness is out of the jurisdiction, and it is desirable to obtain his testimony or deposition, as it is called; and in connection with a bill of discovery (q.v.) in equity. In the first two classes of cases the practice is for the counsel desiring the testimony to obtain an order, or commission, from the court, directing that the examination be taken before some officer competent to administer an oath, and then to prepare his interrogatories and submit them to the opposite party or his counsel, who may prepare cross-interrogatories. In some jurisdictions the legal competency of the questions is settled by the court before the examination, and in others the objections of counsel are noted at the time of the examination and ruled upon at the trial. The commission and the interrogatories are then forwarded to the designated officer, who summons the witnesses on the day fixed, administers the oath, propounds the questions, reduces the answers to writing and transmits them, together with the order and interrogatories, to the court out of which the commission issued. Such examinations are subject to all the rules of evidence. The answers so reported to the court constitute, when read on the trial, legitimate evidence admissible under a recognized exception to the "hearsay rule."

Interrogatories are sometimes annexed to a libel (q.v.) in an action in admiralty, but this is not common practice. See DEPOSITION; EVIDENCE; HEARSAY.

IN'TERSTATE' COM'MERCE. A phrase designating commercial transactions between persons in different States of the United States. The absence of power to secure uniformity in commercial regulations was a source of weakness in the Articles of Confederation and was one of the causes of the adoption of the Constitution. Power is conferred upon Congress by the Constitution (Art. I, Sec. 8, cl. 3) "to regulate commerce with foreign nations and among the several states and with the Indian tribes." It was early held by the Supreme Court in the case of Gibbons *v.* Ogden (9 Wheaton, 1) in which Chief Justice Marshall elaborately discusses the clause, that the subject of congressional action is not limited to regulating traffic, the mere buying and selling or interchange of commodities, but that it comprehends also the means of transportation, and that therefore acts of the New York Legislature granting to Robert R. Livingston and Robert Fulton the exclusive right of navigating the waters of that State with steamboats were void. Congress may exercise control over highways, railroads, and navigable waters whenever they form avenues for commerce not wholly within a single State. This authority extends to rivers wholly within a single State, if such river together with other bodies of water forms a continuous route for commerce to other States or to foreign countries. That the United States has such an interest in these highways that it may secure an injunction to prevent the obstruction thereof was held *In re* Debs (158 U. S. Reports, 564), decided by the Supreme Court in 1894. Congress has power to authorize or regulate the erection of wharves, piers, and bridges, and while, in the absence of congressional action, the States may also make similar local regulations, the authority of Congress is paramount. Congress may make provision as to the means of transportation in regulating the building, equipment, and registration of vessels, their transfer by sale or mortgage, and in prescribing rules for navigation and the qualifications of pilots and engineers. Similarly, in the case of transportation by land between States, Congress may legislate as to the management of railway trains and the duties of employees thereon. By virtue of this power the Safety Act of 1893 was enacted, requiring the use of automatic couplers and continuous brakes upon railroads engaged in interstate commerce.

The carriage of passengers as well as of goods is held to be within the meaning of the clause, so that Congress may provide regulations for the security of passengers. Even the transmission of interstate messages by telegraph or telephone comes under the national authority.

Congress has no right to interfere with commerce carried on wholly within a State or with the manufacture of goods to be sold and consumed wholly within the State of manufacture. The statutory provisions enacted in 1906 for the federal inspection of animals before slaughtering, and of meat and meat products and the establishments in which meat and meat products are prepared, and for the destruction of such meat as is unsound or unfit for human food, are confined to establishments where the products are to be used in interstate or foreign commerce.

Congress cannot regulate contracts which merely relate to commerce. For this reason it has been held by the Supreme Court that fire, marine, and life insurance do not fall within the scope of interstate commerce, and this is a chief obstacle to the proposed federal control of insurance. It has been questioned whether the power to regulate commerce includes the power to prohibit it. The constitutionality of the Embargo Act of 1807, prohibiting all commerce with Great Britain and France, was sustained by the lower courts but never authoritatively passed upon by the Supreme Court. This court, however, decided in 1903 in the Lottery Case (188 U. S. Reports, 321) that lottery tickets are objects of commerce and that their transportation could be prohibited. Four out of nine justices of the court dissented from this decision.

The Sherman Anti-Trust Act, passed in 1890, is an important enactment under the commerce clause. It provides: "Every contract, combination in the form of trust or otherwise, or conspiracy in restraint of trade or commerce among the several States, or with foreign nations, is hereby declared to be illegal." While a combination relating merely to manufacture has been held not to be within the scope of this act, the statute is applicable where there are provisions in the agreement to destroy competition or enhance the price of articles upon sale between the States. An important decision under this statute is that of the Northern Securities Company *v.* The United States (193 U. S. Reports, 197), in which it was held in 1903 by a nearly evenly divided court that a combination of stockholders of the Great Northern and Northern Pacific Railway Companies, to form the Northern Securities Company as a holding corporation to own the majority of the stock of the two railroad companies, was an illegal combination in restraint of interstate commerce. For later judicial interpretations of this statute and for recent amendments, see TRUSTS.

For the provisions of the Interstate Commerce Act of 1887, as amended in 1906 by what is popularly known as the Railway Rate Bill, providing for the fixing by the Interstate Commerce Commission of rates for the transportation of persons or property, see Railways.

Congress is restricted in its power by being forbidden to lay any tax or duty on articles exported from any State (Constitution, Art. I, Sec. 10, cl. 5) and also by the provision that "no preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another; nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another" (Art. I, Sec. 9, cl. 5).

The power of Congress is exclusive of that of the several States wherever the matter regulated is of a national character or admits of or requires a uniform system of regulation, and in the absence of legislation it is to be presumed that Congress intended the common law to remain unchanged so that any State statutes on such subjects will be held void. A State cannot prohibit the exportation or importation of any article of commerce or the delivery within the State of such an article purchased without the State, nor can it impose a tax on the subject of sale of interstate commerce. A State cannot impose a tax upon immigrants, nor can a tax be imposed on a railroad upon freight brought within a State, nor can it levy a tax upon the gross receipts from the business of transportation with other States, for this is in effect a tax upon interstate commerce. It was held by the Supreme Court that the State of Iowa could not prohibit the sale of intoxicating liquors by an importer so long as such liquors remained in the original package and had not been mingled with the mass of property within the State. To counteract the effect of this decision the Wilson Act of 1890 was passed by Congress, providing that intoxicating liquors transported into any State shall upon arrival be subject to the laws of such State, enacted in the exercise of its police powers in the same manner as domestic liquors. Similar statutes have been enacted by Congress to render effective State laws as to game and oleomargarine. Consult: Cooley, *Principles of Constitutional Law* (Boston, 1898); Prentice, *The Federal Power over Carriers and Corporations* (New York, 1907); Interstate Commerce Commission, *The Act to Regulate Commerce (as Amended) and Supplementary Acts thereto* (Washington, 1911); Judson, *The Law of Interstate Commerce* (2d ed., Chicago, 1912).

INTERSTATE COMMERCE ACT. See Railways.

INTERSTATE COMMERCE COMMISSION. See Railways.

INTERVAL (Lat. *intervallum*, interval, from *inter*, between + *vallum*, wall). In music, the difference of pitch between any two sounds, or the distance on the stave from one note to another, in opposition to unison, which is two sounds exactly of the same pitch. From the nature of our system of musical notation, which is on five lines and the four intervening spaces, and from the notes of the scale being named by the first seven letters of the alphabet, with repetitions in every octave, it follows that there can be only six different intervals in the natural diatonic scale until the octave of the unison be attained. To reckon from C upward, we find the following intervals: C to D is a second; C to E is a third; C to F is a fourth; C to G, a fifth; C to A, a sixth; C to B, a seventh; and from C to C is the octave, or the beginning of a similar series. Intervals above the octave are therefore merely a repetition of those an octave lower. A flat or a sharp placed before either of the notes of an interval does not alter the name of the interval, although it affects its quality; e.g., from C to G♯ is still a fifth, notwithstanding that the G is raised a semitone by the sharp. Intervals are classified as perfect, major, and minor. Perfect intervals are those which admit of no change whatever without destroying their consonance; these are the unison, fourth, fifth, and the octave. Intervals which admit of being raised or lowered a semitone are distinguished by the term *major* or *minor*, according as the distance between the notes of the interval is large or small. Such intervals are the third and sixth; e.g., from C to E is a major third, the consonance being in the proportion of 5 to 4; when the E is lowered a semitone by a flat, the interval is still consonant, but in the proportion of 6 to 5, and is called a minor third. The same description applies to the interval of the sixth from C to A and from C to A♭. The second and seventh are also distinguished as major and minor. If the upper tone of a major, or perfect, interval be raised, or the lower tone lowered a semitone, the interval becomes augmented; thus, c–e♯ or c♭–e. By lowering the upper or raising the lower tone of a minor, or perfect, interval by a semitone, a diminished interval results; thus, c–b♭♭ or c♯–b♭. Intervals are further distinguished as consonant and dissonant. Consonant intervals are those which can enter into the formation of a major or minor triad. They are the perfect unison, fourth, fifth, and octave and major and minor thirds and sixths. Thus, c, e, g, c′ (1, 3, 5, 8) and c, f, a, c′ (1, 4, 6, 8) are the tonic triads of C and F major respectively; whereas, with the third and sixth (e, a) flattened, they are the tonic triads of C and F minor respectively. Dissonant intervals are the major and minor seventh and all augmented and diminished intervals. Whenever they enter into a chord, that chord is a dissonance and requires resolution into consonance. The distinction between consonant and dissonant intervals is made according to the ratio of the number of vibrations between any interval and the fundamental tone.

(*a*) CONSONANT INTERVALS		(*b*) DISSONANT INTERVALS	
Unison	1:1	Major second	8:9
Fourth	3:4	Minor second	15:16
Fifth	2:3	Augm. second	64:75
Octave	1:2	Major seventh	8:15
Major third	4:5	Minor seventh	5:9
Minor third	5:6	Dimin. seventh	75:128
Major sixth	3:5	Augm. third	512:675
Minor sixth	5:8	Dimin. fourth	25:32
		Augm. fourth	18:25
		Dimin. fifth	25:36
		Augm. fifth	16:25

Consonant intervals satisfy the ear because of their simple ratios; dissonances give a feeling of unrest and desire for resolution because of their complex ratios. The mathematical relations of intervals are determined as follows: given the normal a′, which is produced by a string vibrating 870 times per second (see Diapason), the octave above is produced by shortening the string by half its length. The number of vibrations will then be doubled, or 1740. This establishes the ratio between the prime and octave of 1 : 2. A string producing e″ vibrates 1305 times. Thus, the ratio between prime and fifth is as 780: 1305, or as 2: 3. The preceding table shows the ratios of the different intervals.

As the length of the vibrating string is in inverse ratio to the number of vibrations, the ratios of the above table need only be inverted to determine the length of the string for any given interval. See HARMONY; MUSIC.

IN'TERVEN'TION (Lat. *interventio*, interposition, a coming between, from *intervenire*, to come between, from *inter*, between + *venire*, to come). 1. In municipal law, an act or proceeding by which a person not originally a party to an action is admitted as such for the protection of a right or interest in the subject matter of the litigation, which will be materially affected by its determination. It has always been a well-established right under the civil law and was early introduced into the English procedure. In a few of the United States the right is confined to actions involving real or personal property, but in most jurisdictions no such limitation exists. A person may be thus admitted as a party plaintiff or defendant, by application to the court before the cause has proceeded to trial. See PLEADING; PARTIES.

2. In international law, the interference of one state in the affairs of another for the purpose of preventing injury to itself, or in behalf of some principle, person, or collection of persons. Intervention may assume several forms. Thus, it may be by verbal note delivered to the ambassador of the country against which the grievance exists; it may be by official notes publicly declared; it may take the form of an international congress or conference; or, finally, it may result in armed interference. It is the last form which is generally understood when reference is made to acts of intervention. Notable instances of intervention have been the invasion of Holland by the Prussians in 1787 to restore to his old position the Stadholder, who was a brother-in-law of the Prussian King; the interference of the Holy Alliance to thwart liberal movements and restore absolutism in Spain, Naples, Sicily, and Piedmont in the early part of the nineteenth century; the interference of Austria and Prussia in behalf of Louis XVI of France in 1791; and the intervention of France in Rome in 1849 to restore the temporal power of the Pope.

No general rule can be laid down to determine when intervention is justifiable. It is well settled that it is excusable as a measure of self-preservation. Thus, in Europe the policy of interference in behalf of the balance of power has been quite common. Any European state may be restrained from pursuing plans of acquisition of territory. Europe is regarded as a confederacy of states, and the balance of power is the guarantee of national existence against the designs of the more powerful states. This principle is not violated by territorial aggrandizements so long as the safety and liberty of neighboring states are not endangered. Notable instances of intervention under this head were that against Louis XIV to prevent him from seating his grandson on the throne of Spain; the coalitions against Napoleon; the interposition of the four Powers in 1840 in favor of the Sultan against Mehemet Ali of Egypt; and that of France and England in 1854 to preserve the integrity of the Turkish dominions against the designs of Russia. Concerted action or intervention by the Great Powers of Europe is sometimes resorted to in order to prevent a smaller state from following a particular line of conduct or to compel it to do a certain act. An instance of this form of intervention was the formal recoguition of the independence of Belgium by the five Great Powers in 1830, when that country emancipated itself from Holland. With the development of modern civilization, humanitarian motives are often appealed to as a justification for interference where cruelty is inflicted by despotism or religious intolerance. Such cases must be carefully scrutinized, for the danger always exists that they may cover ambitious projects for territorial aggrandizement. But interventions on the ground of humanity have under exceptional circumstances certainly a moral if not a legal justification. Such was the intervention of Great Britain, France, and Russia in 1827, by which Greece was liberated from Turkey, and again in the interposition of the Great Powers in .1860 to stop the persecution and massacre of Christians of the Lebanon. The most important recent instance of intervention is that of the United States in Cuba in 1898, which may be referred in part to humanitarian feelings aroused by the cruelties attending the insurrectionary struggle against Spanish authority, in part to the destruction of American property, and the menace to American interests resulting from the possible acquisition of the island by another foreign power. See INTERNATIONAL LAW, and the authorities there referred to.

INTES'TACY (from Lat. *intestatus*, having made no will, from *in-*, not + *testari*, to make a will, from *testis*, witness). The condition resulting from one's dying with property undisposed of by last will and testament. By the present law of England and the United States there is no restriction upon the right of testamentary disposition. This has not always been the case, however, the right of disposing of one's property by will without restriction being a comparatively late acquisition in the evolution of society. Indeed, in Scotland, Louisiana, Quebec, and other States whose legal systems are based on that of the civil law, the power of testation is still limited by the right of children of the testator or other natural objects of his bounty to take by inheritance a certain definite share of his estate. See INOFFICIOUS TESTAMENT.

Intestacy may be complete, as where a person leaving property dies without leaving a valid will; or it may be partial, where a will does not dispose of the entire estate of the testator, either intentionally or through the lapse of a legacy, or the illegality of a specific devise. In either event the property undisposed of passes by the operation of the laws of descent (q.v.) and distribution (q.v.) to the heirs or next of kin of the decedent. See HEIR; INHERITANCE; TESTAMENT; WILL.

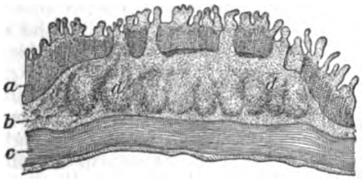
INTES'TINAL STA'SIS. See STASIS, INTESTINAL.

INTES'TINE (Lat. *intestinum*, neut. sing. of *intestinus*, internal, from *intus*, within, from *in*, in). The part of the digestive tract between the stomach and the anus. The small intestine includes the duodenum, the jejunum, and the ileum, and averages 22 feet, 6 inches in the male, 23 feet, 4 inches in the female. With the exception of the duodenum, the small intestine lies in general in the central part of the abdominal cavity, bounded by the large intestine on either side and above. The jejunum and ileum are connected to the posterior abdominal wall by a reflection of the peritoneum, called the mesentery. The duodenum is about 10 inches long, 1½ to 2 inches in diameter, and curved like a horseshoe. The head of the pancreas is received into the curve. It is the part of the intestine which is continuous with the stomach at its pyloric extremity. The jejunum is described under its title. The jejunum and ileum vary much in the arrangement of their coils and there is little regularity in their position beyond that already stated. The term "ileum" is applied to the last three-fifths of the small gut. It ends at the ileocæcal valve, through which the contents of the small intestine escape into the head of the colon. The small intestine has four coats: serous or peritoneal, muscular, areolar or submucous, and mucous. The last is covered with minute prolongations called villi, and lined with columnar epithelium. There are few valvulæ conniventes, or folds of mucous membrane, in the ileum. Solitary glands alone or in aggregations (called Peyer's patches) are found in the lower part of the ileum. These are largely obliterated in typhoid fever.

The large intestine is divided into the cæcum; the ascending, transverse, and descending colon; the sigmoid flexure; and the rectum. It is so placed as to encircle the small intestine. The cæcum lies in the hollow of the right iliac region. From this point the colon rises to the liver, then crosses the abdominal cavity to the opposite side, passing below the stomach to the spleen; then, making a sharp turn, it descends to the left iliac fossa, where it forms a loop termed the sigmoid flexure (from its resembling the old Greek letter sigma); and finally, now termed the rectum, curves back to the head of the sacrum, thence curves backward to the anus. Attached to the cæcum, generally back of it, is a small, short, blind tube, about 3 to 4 inches long, opening into the gut, and termed the vermiform appendix (q.v.). The subdivisions of the large intestine are treated under their own titles. The constant motion of the intestine (peristalsis), by which its contents are conveyed along, is due to the contractions of the muscular fibres of the gut. See DIGESTION.

HISTOLOGY

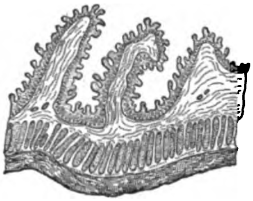
The wall of the intestine is composed of four distinct coats, which from without inward are known as (1) the serous coat, (2) the muscular coat, (3) the submucous coat, and (4) the mucous coat or mucous membrane. These coats present certain differences in structure in the two main divisions of the intestine, the small intestine and the large intestine.



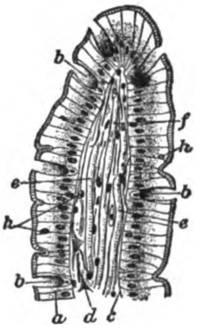
SECTION OF SMALL INTESTINE OF A CAT.

a, mucous coat; *b*, submucous coat; *c*, muscular coat; *d*, *d*, Peyer's patch, cut crosswise.

The Small Intestine. The serous coat of the small intestine consists of a single layer of epithelium or endothelium (forming the peritoneal surface) resting upon a thin layer of delicate connective tissue. Beneath this lies the muscular coat composed of (*a*) an outer portion in which the smooth muscles are disposed longitudinally to the long axis of the intestines and consequently known as the longitudinal muscular coat, and (*b*) an inner or circular coat in which the muscle cells are disposed transversely to the axis of the intestines. The two layers of muscle are separated by more or less connective tissue. The submucous coat consists of loosely arranged bundles of fibrous and elastic connective tissue, with a rich plexus of blood vessels, lymphatics, and nerves. Through the submucous coat are distributed, at varying intervals, circumscribed masses of lymphoid tissue or lymph nodules. These may occur singly (solitary glands, or follicles), lying in both submucosa and mucosa, and may even project slightly from the free surface of the mucous membrane. Or else, instead of a single nodule, there may be a collection of nodules forming what is known as Peyer's patches, which are found mainly in the ileum. Usually from 20 to 30 nodules constitute a patch. Like the solitary nodules, they lie in both submucosa and mucosa and often project upward to the free surface of the intestine. Finally, the mucous membrane of the small intestine is thrown up into transverse or oblique folds, which involve also the submucous coat, and which are known as the valvulæ conniventes. In addition to this the mucous membrane over the valvulæ is studded with minute projections known as villi, which are characteristic of the small intestine. The mucous membrane consists of three coats, the epithelial coat, the stroma, and the muscularis mucosæ. The epithelial coat is composed of a single layer of columnar epithelium, which covers the surface of the mucous membrane. Distributed at intervals among the columnar epithelial cells are clear, transparent cells which, on account of their shape, are called goblet cells, or, because of their secretion, mucous cells. The epithelium rests upon a basement membrane, beneath which lies the stroma. The latter is composed of delicate connective tissue and more or less diffuse lymphoid tissue. It extends up into the villi and supports the vessels, nerves, and glandular structures. From the bottom of the depressions between the villi, glands extend down into the stroma. These are tubular glands, called the crypts of Lieberkühn, and extend down almost

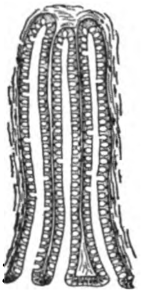


Longitudinal section of human small intestines, showing general relation of the folds constituting the valvulæ conniventes to the mucosa and submucous coat. The latter constitutes the fibrous core over which the mucosa with its villi and glands extends.



Longitudinal section of villus from intestine of dog, highly magnified. *a*, columnar epithelium containing goblet cells (*b*) and migratory leucocytes (*h*); *c*, basement membrane; *d*, platelike connective tissue elements of core; *e*, blood vessels; *f*, absorbent lymphatic radicle or lacteal.

to the muscularis mucosæ. The glandular epithelium is columnar in type, lower than that on the surface of the mucous membrane, with which it is directly continuous. Numerous goblet cells are distributed among the columnar cells. In one portion of the small intestine much more elaborate glands are found. They are situated in the duodenum and are known as the glands of Brunner. They are compound tubular glands, whose acini are situated in the submucosa and whose ducts pass up between the crypts of Lieberkühn and empty between the villi. The muscularis mucosæ is the innermost layer of the mucous membrane. It is composed of smooth muscle cells, whose long axes correspond mainly to the long axis of the intestine. At certain points a more or less complete internal circular layer is present. See BRUNNER'S GLANDS.


Simple tubular glands of large intestines of dog; the epithelial elements lining the follicles have become very largely converted into goblet cells.

Blood Vessels, Lymphatics, and Nerves. The larger arterial trunks pierce the serous and muscular coats, in which they give off branches, and form a rich network in the submucosa. From this network smaller branches are given off, which form a capillary anastomosis throughout the mucous membrane, extending up into the villi. From the capillaries arise veins which empty into the venous plexus of the submucosa, from which larger venous trunks pass outward, accompanying the arteries. The lymphatic system of the intestine is very extensive. Beginning as blind canals in the villi, the lymphatics pass downward to form a plexus in the deeper layers of the mucosa and in the submucosa. From this plexus larger lymphatic vessels pass outward to the mesenteric lymph glands. The nerves of the intestine are mainly nonmedullated fibres from the abdominal plexus of the sympathetic. Between the two muscular layers the nerve fibres form a rich plexus, known as the plexus of Auerbach. From this plexus fibres extend to the submucosa, where a second plexus, called the plexus of Meissner, is formed. In both plexuses microscopic groups of ganglion cells are found.

The Large Intestine. This differs from the small intestine in several important particulars. The mucous membrane is entirely devoid of villi, and its glands, which are of the simple tubular variety, open upon the surface of the mucosa. In the cæcum and colon the internal muscular coat is thinner than in the small intestine, and the external longitudinal muscle, instead of completely surrounding the gut, as in the small intestine, is collected into three flat bands. As these bands are shorter than the other layers which make up the intestinal wall, they are responsible for the sacculation which is so characteristic of the large intestine. In the rectum the serous coat is replaced by a fibrous coat, and towards the anus the circular muscular coat becomes thickened and is composed of voluntary muscle, forming the internal and sphincter muscle. Solitary lymph nodes occur throughout the large intestine. The collections of nodes known as Peyer's patches are, however, usually confined to the small intestine. The distribution of blood vessels, lymphatics, and nerves is similar to that in the small intestine. See ALIMENTARY SYSTEM.

INTI, ĕn'tē. The deified sun, worshiped by the Incas of Peru.

INTIM'IDA'TION (from ML. *intimidare*, to intimidate, from Lat. *in*, in + *timidus*, afraid, from *timere*, to fear). Literally, the act of putting one in fear. In law, specifically, the use of this means for the purpose of inducing a person to enter into an obligation or to pay money or to do or refrain from doing some other act. In general the act induced by intimidation may be repudiated, and any money paid or other property parted with under its influence may be recovered in a quasi-contract action. But such a contract or other transaction is not wholly void, but only voidable at the election of the intimidated party.

In England it is a statutory offense punishable as a crime to intimidate a person with a view to compel him to abstain from an act which he has a legal right to do, or to do an act which he has a legal right to abstain from doing. Intimidation is not, save in exceptional cases, an excuse for committing a crime.

To constitute intimidation the duress employed must consist in actual violence or unlawful imprisonment, or in threats of violence calculated to cause fear of life or bodily injury to the intimidated person or his or her husband or wife or child, or in threats of criminal proceedings.

With respect to the more subtle forms of coercion sometimes employed in trade and labor disputes—such as the boycott, strikes, and the like—there is often grave question whether they amount to unlawful intimidation or not. When the acts complained of as constituting intimidation are unlawful in themselves, regardless of the question of their coercive effect, there is no difference of opinion in the cases in holding that such acts, when they reasonably result in coercing a person from the exercise of his legal freedom of conduct, constitute unlawful intimidation; as where actual physical violence is threatened and overt acts are done in pursuance of the threat.

Where, however, the acts complained of result in intimidation because of the number of persons by whom they are done in concert or in accordance with a common plan of so affecting the business or affairs of plaintiff, but would be harmless or ineffectual without such combination, the decisions are at variance. For example, the courts are not agreed as to what is and what is not legal picketing, as it is called; as to the legality of notice posted in the meeting rooms of trade-unions affecting the standing of particular employers; as to the legality of stigmatizing a shop as a scab shop; of the manner that may be used in requesting other workmen to quit work; of notifying employers that they have nonunion men who must be discharged to prevent a strike; of the fining of members to compel them to strike, etc. Formerly the law was unjust in its discrimination against the performance of these acts by combinations of workmen or others, but these rules have been much modified both by statute and judicial decisions. Generally speaking, the courts of the United States and of some States, as Massachusetts and New Jersey, adhere more closely to the spirit of the old common-law rule than is done in some of the other States, as

New York and Illinois, where the effort of organized labor has been more effective in modifying it. The most general question that remains unsettled is as to whether it is lawful for a body of men to do in unison or in pursuit of a common purpose any act which it would be lawful for each member of the body to perform as an individual, or whether such acts so performed may under the given conditions amount to a conspiracy. Consult, for a statement of the latest development of the subject in Great Britain, the case of Allen *v.* Flood, *House of Lords Cases* (London), and, in the United States, The National Protective Association *v.* Cummings, *New York Court of Appeals Reports* (New York, 1902); Beattie *v.* Colleman, *New York Supreme Court Reports* (ib., 1903); Groat, *Attitude of American Courts in Labor Cases* (ib., 1911); Laidler, *Boycotts and the Labor Struggle* (ib., 1914). See CONSPIRACY; DURESS; TORT; STRIKES AND LOCKOUTS; BOYCOTTING; PICKETING.

INTINE, ĭn'tĭn *or* ĭn'tĕn (from Lat. *intus*, within). The inner and more delicate layer of wall of an aërial spore. The outer and heavier one is called the exine. The intine is also sometimes called the endospore, in which case the exine is called the exospore. In some cases, especially among water plants, a third spore coat is developed, and is called the perinium. This is a very conspicuous coat in the spores of *Equisetum* (q.v.). When the spore of an *Equisetum* matures, this perinium unwinds, as though it were composed of two spiral bands, thus exposing the exine or ordinary outer spore coat. See SPORE; EXINE.

IN'TONA'TION (from ML. *intonare*, to sing according to tones, from Lat. *in*, in + *tonus*, Gk. *τόνος*, *tonos*, tone; connected with Lat. *tendere*, Gk. *τείνειν*, *teinein*, Skt. *tan*, to stretch). In music, the production of tone either by an instrument or by the voice. It is of no importance in keyed instruments like the piano or organ, as the performer can strike only the proper key and is powerless if the instrument is not in tune. But the matter of intonation is of utmost importance in the voice and all string and wind instruments. Only a person having a finely trained ear is able to produce proper intonation. Hence we speak of pure and false intonation. In plain chant music the term denotes the opening phrase sung alone by the precentor (the celebrant of the mass), as *Gloria in excelsis Deo*, *Credo in unum Deum*.

INTOX'ICAT'ING LIQUORS. All liquors which may reasonably be used as beverages and which contain enough alcohol to produce entire or partial intoxication if drunk in ordinary quantities. An exact definition of this term is important under all excise and prohibition statutes, but as many palatable mixtures containing alcohol are sold in evasion of such laws, no definite enumeration of such liquors is possible. The statutes of many States are broad enough to cover all preparations or compounds containing alcohol when they come within the above definition.

The courts in most jurisdictions will take judicial notice of the intoxicating character and effect of the well-known liquors, such as gin, whisky, brandy, etc., but will require proof of the intoxicating qualities of mixtures containing alcohol, such as cordials or the various commercial, or proprietary, tonics. An interesting discussion of the subject will be found in the "Intoxicating Liquor Cases," reported in 25 Kansas Rep. p. 751. The law deals with intoxicating liquors in three ways: (1) by regulating and restricting the manufacture and sale thereof as a measure of public policy; (2) by imposing excise taxes and license fees for its manufacture and sale; and (3) by statutory protection of its purity. See EXCISE; LIQUOR TRAFFIC; LICENSE; PROHIBITION.

INTOX'ICA'TION (ML. *intoxicatio*, from *intoxicare*, to poison, from Lat. *in*, in + *toxicum*, from Gk. *τοξικόν*, *toxikon*, poison, originally that poison in which arrows were dipped, from *τοξικός*, *toxikos*, relating to a bow, from *τόξον*, *toxon*, bow). In medicine, poisoning by any agent; colloquially, a condition of impaired will and undermined control resulting from drinking alcoholic beverages. Intoxication is as correctly used of serious disturbance of mental and physical equilibrium by the use of opium, chloral, belladonna, cannabis indica, or by the ingestion of lead, as of the poisoning resulting from the use of liquor. Alcoholic intoxication may be acute, subacute, or chronic. Acute intoxication follows drinking a considerable quantity of liquor at once. Profound insensibility follows speedily, with stertorous breathing, purplish face, frothing at the mouth, weak pulse, and increasing coma. An active purge, such as croton oil, put on the root of the tongue or introduced into the rectum, together with hypodermic injections of strychnine, both used after the employment of the stomach pump, may be efficacious and save life. This form of intoxication is rarely seen. The subacute form is the usual drunkenness, of mild or serious type. It is the form observed in those who drink alcoholic beverages for the exhilaration they feel, or in those who drink till they are stupefied. Slight intoxication causes increased activity of the circulation and of nervous and mental processes, as well as in most cases derangement of the digestive apparatus. Heavy drinking results in delirium, staggering (due to cerebellar disturbance), loss of muscular power, and finally stupor. Vomiting, depression, and tremor appear when the person awakes or becomes conscious. An emetic, a cathartic, and a Turkish bath often rouse an intoxicated person when becoming drowsy, and prevent the occurrence of the coma which threatens. But after repeated indulgences these measures fail. Ammonia and strychnine are both very serviceable in treating the conditions existing after the patient is aroused from his unconsciousness. Habitual intoxication results in delirium tremens in some cases. (See DELIRIUM.) In others it leads to alcoholic insanity. (See INSANITY.) Serious organic diseases result from the use of alcohol, such as general neuritis, cirrhosis of the liver, cirrhosis of the kidneys with secondary heart disease, and arteriosclerosis, all of which are discussed under their proper titles. The will becomes undermined, judgment becomes impaired, and the idea of moral responsibility becomes diminished or lost. Intoxication from wood alcohol, often used as an adulterant of alcoholic drinks and patent medicines, is apt to produce blindness and frequently death.

Inebriety. This is the diseased mental condition resulting from the use of alcohol. There may have been an underlying neurasthenia, which has led the patient to seek some agent which will remove his weakness and lack of endurance. Repeated recourse to alcoholic stimulation frequently results in inebriety in such a case. Heredity plays a prominent rôle in the causation of inebriety. Inebriety or insanity is found in the ancestry of about half the cases. Race has a certain influence. Denmark and Belgium suffer from the greatest amount of inebriety in the continental countries; Russia and Germany come next, and France, Sweden, Austria, and Switzerland follow. The Anglo-Saxon seems very susceptible to the disease. The Italian is singularly free from it, and the Spaniard has nearly as good a record. The Jewish people present an example of general freedom from inebriety wherever they are found. A hot, moist climate favors inebriety by reducing general nervous resistance. Exposure and occupation have also an evident influence. The mortality from alcoholism is stated by Norman Kerr to be 40,000 annually in Great Britain. He quotes Lankester as saying that one-tenth of the entire mortality in Great Britain is due to alcoholism.

Medicolegal Aspect. The tendency to commit crime is much greater in inebriates than in others, because of the weakening of the will and the lessened moral sense. It is held that intoxication is no excuse for commission of crime, and the criminal who remembers nothing of his acts committed while under alcoholic influence must pay the penalty due to his offenses. Consult: Kerr, *Inebriety* (Philadelphia, 1894); J. S. Billings, *Physiological Aspects of the Liquor Problem* (2 vols., Boston, 1903); B. G. Cutten, *Psychology of Alcoholism* (New York, 1907); H. S. Williams, *Alcohol, and how it Affects the Individual* (ib., 1909); J. W. A. Cooper, *Pathological Inebriety* (ib., 1913); F. Hare, *Alcoholism: Its Clinical Aspects and Treatment* (Philadelphia, 1913). See Alcohol, Pharmacology, Toxicology, and Therapeutic Use; Alcoholism, and the authorities referred to thereunder; Dipsomania.

INTRA, ēn'trȧ. A manufacturing town in the Province of Novara, Italy, on Lago Maggiore (q.v.), between the mouths of the San Bernardino and San Giovanni rivers (Map: Italy, B 2). It has a school of trade and industry; manufactures, with its water power, cotton goods, hats, lumber, leather, and machinery. On its outskirts are many beautiful villas overlooking Lago Maggiore. Pop., 1901, 6902; 1911, 8036.

IN'TRAMERCU'RIAL PLANET. See Vulcan.

INTRANSIGEANTS, äN'träN'sē'zhäN' (Sp. *intransigente*, uncompromising, from Lat. *in-*, not + *transigere*, to make a settlement, from *trans*, across + *agere*, to act). A term applied in European politics during the last half century to any ultraradical element. In Spain the name was given to a party of Red Republicans and Socialists who, after the declaration of the Republic in 1873, attempted to divide up the country into cantons and to introduce a communistic régime. They held Carthagena for six months against the government, but were put down by the dictator Castelar and General Dominguez. The term had been used in France before this at the time of the Commune. *L'Intransigeant* is a newspaper established in Paris by Henri Rochefort (q.v.), the famous Radical politician.

INTRENCHED CAMPS. See Fortification.

INTRENCH'MENT (from *intrench*, from *in-* + *trench*, from OF. *trencher*, *trancher*, Fr. *trancher*, to cut, from Lat. *truncare*, to lop, from *truncus*, trunk, from *truncus*, OLat. *troncus*, maimed). Any form of constructive defense work by which soldiers strengthen a position or fortify it against an enemy. See Fortification; Trench, Military.

INTRODUCED SPECIES. Animals and plants brought into a country from a foreign land by the agency of man. In the settlement of North America from the Old World scores of species of plants, mostly noxious weeds, and hundreds of species of animals, largely parasitic or destructive to agriculture, have been introduced. Among plants, chicory, wild garlic, and the water hyacinth of Florida are examples of the great spread of introduced species. Domesticated animals may escape from captivity and become noxious. The wild pigs of our Southern States and the Galapagos Islands are examples. Goats have become wild in many places and have wrought great destruction. Thus the island of St. Helena, which is now a barren rocky desert, was formerly clad with forests. The change has been brought about in four centuries by goats. Cats that have become wild on islands have in many cases exterminated species of birds there. Rats and mice, in some cases previously imported from Asia, have been introduced into America from Europe and have spread everywhere, exterminating native species and conquering one another.

The European rabbit was introduced into Australia in 1864 for sporting purposes. By 1879 legislatures were enacting laws for its destruction, and recently an important industry has arisen in rabbit skins and canned rabbit meat. The setting free of Belgian hares in America is attended with dangers. (See Rabbit.) The mongoose of India was introduced into Jamaica in 1872 to rid the island of rats, whose depredations caused an annual loss of $500,000. In 1882 the mongoose had caused such a diminution in the rats that the annual loss from rats was reckoned at about one-half the former amount; but the mongoose multiplied, and domestic animals and barnyard fowls were destroyed by it in vast numbers; next native vertebrates fell a prey, also bananas and other fruits. About 1890 the mongoose became recognized as the worst pest of the island and as doing vastly more harm than good. Of late years, however, the depredations of the animal have begun to diminish. (See Mongoose.) Other examples of imported animals which have wrought untold damage might be cited at great length. The English sparrow, the cabbage butterfly, the Hessian fly, the gypsy moth (in Massachusetts) are familiar examples elsewhere described in detail. The reason why introduced animals thrive to so extraordinarily a degree is because they are removed from their natural enemies, and those that might keep them down have not learned to do so. Usually, in time, enemies are acquired, as they have been by the English sparrow, and thus the balance in nature is restored. Consult Palmer, "The Danger of Introducing Noxious Animals and Birds," in *Year Book of Department of Agriculture* (Washington, 1898). See Acclimatization; Isolation.

IN'TRODUC'TION (Lat. *introductio*, a leading in, from *introducere*, to lead in, from *intro*, within + *ducere*, to lead). In instrumental music, a shorter movement preceding the composition proper. According to the character and length of the composition the introduction may be shorter or longer. In a polonaise, waltz, etc., the introduction generally consists of only a few bars. In works written in sonata form the introduction can assume great dimensions, as in Beethoven's *Second* and *Seventh Symphonies*. The thematic material upon which the introduction is built may be entirely original and independent of any themes in the following principal movement, as in the case of the two Beethoven symphonies. Then again the introduction may be constructed upon themes of the movement proper, as in the case of Schumann's *First Symphony*. As the introduction is invariably in a slow tempo, the themes of the allegro appear almost invariably in augmentation when used in the introduction. But it is by no means obligatory to begin every longer composition with an introduction. Of Beethoven's symphonies the third, fifth, sixth, eighth, and ninth begin without any introduction.

In dramatic music the term "introduction" has several meanings. In the older operas, which were divided into *numbers*, the introduction was the second number. It followed the overture and generally was a short instrumental passage leading into the opening chorus. But even Gluck sometimes united the overture with the introduction. Some operas have no overture, but only an introduction of greater or less extent. Such works as Verdi's *Otello* or *Falstaff* have, properly speaking, not even an introduction. Beginning with *Lohengrin*, Wagner abandoned the form of the overture and substituted an introduction which he usually calls "Vorspiel" (q.v.), although in *Tristan und Isolde* he employs the term "Einleitung." Besides the principal introduction at the beginning of his dramatic works, Wagner generally opens every act with an introduction of some length.

IN'TRO'IT (Lat. *introitus*, entrance). An antiphon sung or said at the beginning of the mass, varying with the season or festival. After the antiphon proper comes a verse from the Psalms, followed (except in requiem masses and in Passiontide) by the Gloria Patri and the repetition of the antiphon. By the Vatican Gradual of 1908 it is to be sung during the procession from the sacristy to the altar, and then read from the missal by the celebrant. The opening words of the introit are commonly used in ecclesiastical terminology to designate the proper mass of the day, and certain Sundays are even popularly known in the same way, as *Gaudete, Lætare, Quasimodo* Sunday, etc. This practice is very usual in mediæval documents and authors.

IN'TROMIS'SION (ML. *intromissio*, from Lat. *intromittere*, to send within, from *intro*, within + *mittere*, to send). In Scots law, the assumption of legal authority to deal with another's property. It is divided into legal and vicious intromission. Legal intromission is where the party is expressly or impliedly authorized, either by judgment or deed, to assume the management and control of another person's estate. Vicious intromission is where a person without legal authority interferes with a deceased person's estate, as by assuming to act as heir or as executor of a will. Such acts constitute a usurpation, but have a certain qualified validity and cannot be impeached collaterally. They correspond to the acts of an executor *de son tort* of English and American law. See EXECUTOR.

IN'TROSPEC'TION (from Lat. *introspicere*, to look within, from *intro*, within + *spicere*, *specere*, to look; connected with Gk. *σκέπτεσθαι*, *skeptesthai*, Skt. *spaś*, *paś*, to look, OHG. *spehōn*, Ger. *spähen*, to spy). The specific method of psychology, as observation or inspection is the specific method of physical science; also termed SELF-OBSERVATION or "INNER PERCEPTION." The three names are characteristic of three different attitudes towards the study of mental phenomena, which we may term the rationalistic, the empirical, and the experimental. (1) Kant declared that a science of mind is impossible; for the reason, among others, that the method of psychology is impracticable: self-observation implies a change of the very facts which we desire to observe. If self-observation were, literally, the method of psychology, Kant's objection would be valid: there could be no ascertainment of mental uniformities, no science of mind; the more attentive the observer and the more systematic his use of the method, the scantier would be his harvest of facts; speculation would have free play. Hence the empirical school (2) substituted for self-observation the method—or, rather, the unmethodical employment—of inner perception (*innere Wahrnehmung*). Observation is planned and prepared for; perception, the noting of events and conditions as they appear, is a matter of happy accident. Now inner states and processes can be perceived or noted as well as outer; there is no self-contradiction involved in the phrase "inner perception"; but, at the same time, the loss of the plan and system implied by the term "observation" is a serious handicap to a science and must lead to inadequacy both of description and of theory. We find, accordingly, that the introspection or inner perception of the empirical psychologists has no claim to rank as a true scientific method. It makes the cardinal mistake of considering merely the most obvious aspect of mind—its cognitive function; it views mental processes always through the glass of meaning, of logical import; it tells us what mental events stand for, but not what they are. We should gain little knowledge of the anatomy of our bodies by a superficial cataloguing of the bodily functions as they are apparent in the occurrences of everyday life; indeed, we might go sadly astray in our attempt to translate function into the unknown language of structure. The same thing holds of mind as interpreted by the method of inner perception. (*a*) In the first place the method leads to an overemphasis of what James has called the "substantive" factors in the stream of thought and to an underemphasis of the "transitive" parts. We read of images and ideas and representations, but the "fringes" of these psychical entities, the elusive and yet essential processes which Spencer (still in logical terms) has denominated "feelings of relation," are left entirely out of account. The result of this error is that mind is pictured as if composed of discrete and sharply separable terms (the "sensations" or "ideas" which correspond to the simplest "bits of knowledge"), instead of being presented as what it really is, a shifting continuum, a tangle of ever-moving and ever-changing processes. (*b*) A second mistake to which inner perception is liable is that which has been called par excellence the "psychologist's fallacy." The psychologist is tempted to read himself, his own knowledge and attitude, into the mental process or group of mental processes which he is considering. Instead of taking the mental stuff as it is, in the incompleteness and abstractness which are conditioned upon its detachment from context, he rounds it off and supplements it by his outside knowledge of this context. He is thus tempted into a twofold error. On the one hand—misled by the poverty of language, which ordinarily names a perception or idea by naming the object to which it refers, no matter what the mode or character of this reference may be—he is easily brought "to suppose that the thought, which is of the object, knows it in the same way in which he knows it, although this is often very far from being the case." On the other hand, since he is himself familiar with all the relations in which the given mental process stands, he is apt to read an awareness of these relations into the process; he makes the process conscious of itself as he is conscious of it. The result is that we are furnished not with a description, but with a logical construction of mind; while, as there is no appeal from the logical construction to the facts, empirical psychology is full of quasi-logical controversies, that are not only long drawn out, but are in the nature of things incapable of psychological termination.

(3) We arrive at introspection proper only when we reach the point at which the experimental method is introduced into psychology. (See Psychology, Experimental.) This does not mean that there was no valid introspection before there was experiment; men are often better than their methods. Nor does it mean that all the results of experimental research are the fruits of an unimpeachable introspection; methods may be better than the men who use them. It means that, with the advent of experimental control, psychology was able to combine the attitude of inner perception with the plan and system of self-observation, and that this science thus acquired a method which is as accurate and reliable in principle as are the methods of the physical sciences. Experiment enables us so to regulate external conditions that a determinate mental occurrence may be induced at a determinate moment of time; it enables us, further, to prevent any modification of consciousness save by the occurrence under investigation. Given a state of concentrated attention (q.v.) on the part of the observer, the requisite degree of practice, and an adequate command of language wherewith to report the experience (see Discrimination, Sensible), and there is no reason why a psychological introspection may not be as exact as an observation in chemistry or physics. The sole difference between inspection and introspection lies, in fact, in the determination (see Determining Tendency) of the observer. And since, with practice, the psychological determination becomes habitual and unconscious, introspection need not itself be a mental process; so that there is no ground for the Kantian objection that it alters the process to be observed, as there is none either for the objection that introspection must always be retrospection, and is therefore exposed to the illusions of memory. Feeling (q.v.), it is true, appears to offer special difficulties to introspection, since it cannot be made the direct object of attention. But recent work has shown that, under the determination to report upon feeling, we may give attention to the sensory aspect of the situation, and that the feelings aroused will then touch off relevant reports.

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INTRU'SION (ML. *intrusio*, from Lat. *intrudere*, to thrust in, from *in*, in + *trudere*, to thrust; connected with OChurch Slav. *truzdati*, to torment, and probably with Goth. *þriartan*, AS. *þrēotan*, OHG. *-driozan*, Ger. *-driessen*, to vex). In English law, an unlawful entry upon a freehold estate, not at the time in the actual seisin of the rightful owner, and with the view of ousting him of his estate. It could be effected in the interval between the death of a tenant in fee and the actual entry of the heir, or between the death of a tenant for life and the entry of the remainderman. Though not technically classed as a disseisin (q.v.), it had similar effects, vesting the seisin and title in the intruder. The usual remedy for an intrusion was by a writ of entry. The distinction between the several kinds of ouster (q.v.), dependent upon the time or manner in which it was effected, has generally been abolished in England and the United States, and the whole subject comprehended under the description of adverse possession and disseisin. In Scots law the term is employed in a looser sense to describe a trespass upon lands. See Adverse Possession; Disseisin.

IN'TUBA'TION. The passage of a tube into the larynx between the vocal cords to keep the air passages open in cases of diphtheria, stricture, or other obstruction. The tubes used are those invented by Dr. Joseph O'Dwyer in 1883 and are made in graduated sizes for children of different ages. They are from 1½ to 3 inches long, with a flattened upper extremity to prevent slipping down beyond the larynx, an accident which is further guarded against by the fusiform shape of the tube. A special instrument is employed to introduce the tubes, and another similar device, an extractor, is used to withdraw them. The child is held during the procedure either in the upright or recumbent position. See Tracheotomy.

IN'TUI'TION. See Instinct.

IN'TUI'TIONISM, or **IN'TUI'TIONALISM** (from *intuition*, from ML. *intuitio*, immediate cognition, from Lat. *intueri*, to look at, from *in*, in + *tueri*, to look). The name of the theory that our knowledge of at least some fundamental principles, whether of metaphysics or of ethics, is due to the fact that they present themselves to us as true in their own right and therefore need no proof of any sort. The view supposes that we have certain faculties for the immediate apprehension of these principles: we merely have to look at the statement of these principles to see that they are true; thus, our intellect is supposed immediately to apprehend the truth that two and two are four, and our conscience the truth that theft is wrong, or that action prompted by benevolence is better than action prompted by sensual appetites. In ethics intuitionism is also used to designate the view that not only general principles are immediately apprehended, but the rightness or wrongness of each particular act. These views fail to recognize the fact that an unreasoned assurance of a truth may be the psychological outcome of forgotten processes of reasoning. See Induction; Knowledge, Theory of.

IN'TUSSUSCEP'TION (from Lat. *intus*, within + *susceptio*, a taking up, from *suscipere*, to take up, from *sub*, under + *capere*, to take), or Invagination of the Intestines. A displacement of a portion of the intestine into the part immediately below, just as the finger of a glove may be partly drawn within itself when the hand is withdrawn. This is a common form of intestinal obstruction occurring most frequently in infants and young children. The exciting *cause* is usually some irritant bringing about irregular and exaggerated intestinal peristalsis. Injudicious diet, the careless use of cathartics, and the presence of intestinal polyps are the common causative factors. The *pathological conditions* present are the invagination mentioned above, and more or less inflammation in the affected part of the intestine. The commonest site of the lesion is at the junction of the small and the large intestines. The involved portion of the intestine may measure anywhere from a few inches to as many feet. Unless promptly treated, death usually results in a short time from gangrene of the intestine, perforation, and general peritonitis. In adults the invaginated portion of the intestine may become gangrenous, separated, and passed per rectum. Such a termination is frequently followed by the formation of a contracting scar, resulting in a chronic form of obstruction. The symptoms are: violent abdominal pain, rather sudden in its onset; vomiting of stomach contents and of biliary and fæcal matter; abdominal distention; the passage of bloody mucous per rectum; collapse; normal or subnormal temperature. Palpation reveals the presence of a tumor, described as "sausage-shaped"; by rectal examination the invaginated gut may in some cases be felt with the finger, or it may even protrude through the anal orifice. The *treatment* is purely surgical and should be prompt. A laparotomy is performed and the intestinal displacement corrected. The prognosis is not at all bad in cases operated on early. In neglected cases the disease is almost invariably fatal.

INTUSSUSCEPTION. A term applied by plant physiologists to that type of growth in which the new particles are laid down between the old particles that compose the cells or cell organs. It is used as the counterpart to growth by "apposition," in which the new particles are laid down on the outside of the growing structure. The first type was once supposed to distinguish growth in the organism from increment of nonliving bodies, but the distinction lacks validity. Growth of the starch grain or the cell wall in thickness is largely by apposition, while intussusception seems to play an important part in the growth of the protoplasm and of cell walls in area.

INULASE. See Digestion in Plants.

IN'ULIN. A group of polysaccharides, displacing starch as important storage materials in the underground organs of many Compositæ, Campanulaceæ, and representatives of several other families of plants. It is especially abundant in *Inula helenium*, *Helianthus tuberosus*, *Anacyclus officinarum*, *Arctium lappa*, and other species. Inulin forms a white powder similar in appearance to starch, but differing from it in certain important respects. It exists in cells as colloidal solutions, readily transformed to spherocrystals by the addition of absolute alcohol or glycerin. Upon hydrolysis by inulase or acid it produces *d*-levulose. It stains brown with iodine.

IN'UNDA'TION (Lat. *inundatio*, from *inundare*, to overflow, from *in*, in + *undare*, to rise in waves, from *unda*, wave; connected with OHG. *undea*, *unda*, AS. *ȳþ*, wave). Many large areas of low ground near rivers or the ocean are in danger of inundation from various causes. Of these inundations the most common, and probably also the most destructive, are the river floods that result from unusual rains or melting snows. Most rivers are subjected to rising and falling by these causes, and those that flow through flood plains or deltas may rise and overflow the bordering plains. The best-known instance of such river flooding is supplied by the Nile, which makes possible the existence of millions of people on the Nile oasis in the broad African desert. The rising of the waters begins in June in the lower Nile, the accumulation having taken weeks to flow down the river channel from the upper waters. It continues till September, and at Cairo the water reaches a height of 25 feet above the normal river level. A vast tract of flood plain and delta is inundated, and this water makes agriculture possible in the desert and is the basis upon which the ancient Egyptian agriculture was founded. The sediment deposited by the floods fertilizes the land and is raising the level of the flood plain at a rate of over four inches a century.

The Mississippi also supplies an illustration of great river floods. An area of 30,000 square miles, inhabited by 1,000,000 people, is liable to floods. Low natural embankments, built by the floods and called natural levees, keep the river in its channel, excepting during very high water; and levees added by man are built from the Gulf to Cairo in the effort to hold the extraordinary floods. But even these artificial levees are sometimes ineffective. Crevasses 50 to 500 feet wide break through the levees, and a vast area is inundated. These great floods come usually between February and May and are caused by the coincidence of heavy rains or rapidly melting snows, or both, in the Missouri, Mississippi, and Ohio valleys. During the great floods the discharge of the Mississippi reaches 2,000,000 cubic feet per second and is far in excess of the capacity of the channel. The water level then rises 40 or 50 feet, and great destruction of life and property results. Great inundations by the Mississippi are recorded in 1828, 1844, 1849, 1850, 1853, 1859, 1863, 1867, 1870, 1874, 1882, 1884, 1890, 1892, 1893, 1897, 1903, and 1912. In the flood of March and April, 1912, the water spread over an area of 15,000 square miles and inflicted damage to the extent of $45,000,000. See Mississippi River and accompanying bibliography.

The most disastrous flood that has befallen the United States occurred in the Ohio valley during the last of March and the first part of April, 1913. It was brought about by the excessive rainfall in northern Indiana and Ohio, which amounted to from 6 to 10 inches in a period of five days. The damage to property was reckoned at about $180,000,000 and the loss of life at 415. Dayton, Ohio, was nearly destroyed by the rush of waters.

The Hoang-ho of China flows out of its mountainous course over a low alluvial fan delta which is rapidly growing out into the sea. The town of Putai, which was on the seacoast about 2000 years ago, is now over 40 miles inland. Not only is the alluvial fan delta growing outward, but upward, and when the river bed is built up above the level of the surrounding plain the course of the stream becomes exceedingly unstable and liable to shifting in time of flood. The river then sometimes bursts through levees fully 70 feet high, erected more than half a mile from the banks. It has shifted its course nine times in 2500 years, laying waste a region as large as Great Britain. Its mouth has changed position fully 200 miles by these shiftings. In the flood of 1887, which covered an area of 50,000 square miles, densely populated, 1,000,000 people were drowned, and still more lives were lost by the famine and disease that followed the disaster. The river has been used as a weapon of war as far back as the year 1209. Hundreds of thousands of people have thus been drowned by the turning of the river floods against them. Smaller river floods are of common occurrence and are frequently caused by ice jams, which form a temporary dam and hold the water back. The bursting of the dams of artificial ponds and lakes also causes destructive floods.

Inundations of the sea are far less widespread than those of rivers, because some coasts are too high, and others are not frequently visited by high sea or "tidal waves." The great number of river lowlands and the frequency of the causes of a rise in the river water make these river floods more general than those of the sea. But where low coasts are exposed to inundations of the sea, the results are terribly destructive, especially since the lowland coasts are usually densely populated. There are various causes of inundations by the sea; the simplest are illustrated by those countries which are actually below the level of the highest tides and are protected from inundation by sand-dune hills and dikes. The Netherlands offer the best illustration. This plain is the delta of the Rhine and Meuse and is open to floods from river and ocean, and parts of it lie well below the level of the sea. At various times the dikes, which were formerly less solidly constructed than at present, have given way, and large tracts have been submerged, causing a vast destruction of life and property. For example, in 1421 a flood destroyed 72 villages, and 100,000 people perished. During the Spanish wars the people voluntarily admitted the sea to protect their cities from the attacks of the Spaniards.

Even dry land several feet above sea level is subject to inundations by the sea when there is some unusual rise in the water, commonly called a "tidal wave," doubtless because it reaches its greatest height at high tide. The lowlands of the Netherlands, Denmark, and England have suffered from such floods when high winds have driven water upon the shore and piled it up at periods of unusually high tide. At such times the surface of the sea may rise 10 or 15 feet higher than the normal reach of the high tide. The West Indies, the Gulf coast, and the coast of the Middle Atlantic States are subject to such inundations during the passage of the fierce tropical hurricanes. The flooding is experienced even as far north as New York and Boston; and the destruction at Galveston, Sept. 8, 1900, when thousands of lives were lost, was due to the passage of one of these hurricanes. The Sea Islands on the Georgia coast are occasionally flooded during these storms, and any low point along the coast south of New York is liable to such "tidal waves" at any time, but especially in August and the autumn months, when tropical hurricanes develop most commonly. High water followed the hurricane of Sept. 3–12, 1889, all the way from the West Indies to New Jersey. The rise in the level of the ocean during the passage of these storms is due to the combination of ordinary tides with the effect of the steady violent winds which drift the water before them and pile it up on the shelving shore. As illustrated in Galveston, this wave rises over ordinarily habitable land, undermining houses, and thus aiding in the destruction done by the winds themselves and the waves which these winds raise on the surface of the sea.

Far greater destruction of life is accomplished in the Pacific than in the Atlantic by these tropical storms, there called typhoons. The sea wave washes over low coral atolls. In the case of the Samoan hurricane of March 15, 1889, a typhoon washed ashore 21 vessels that were anchored in the harbor of Apia. Some 150 of the sailors on these vessels were drowned, and only two of the ships that were in the harbor were afloat after the hurricane. Typhoon waves advance on the low delta coasts of India and southern China. There has been case after case of destruction of life to the number of many thousands in the delta lowlands of Asia; and in at least one case, in 1876, it is estimated that 150,000 people were killed by such an inundation in the delta of the Ganges and Brahmaputra.

Finally, sea waves generated by earthquake shocks may inundate coastal lands. These, again, are best illustrated on the low, densely populated coasts of Asia, where earthquake shocks are numerous. The earthquake wave, caused by a jar along the seashore or on the sea bottom, disturbs the entire sea from surface to bottom. The wave is dome-shaped, though not very high, perhaps not over an inch or two. But it is so deep and broad that, advancing over the shallowing bottom towards the shore, it grows higher and higher, perhaps reaching a height of 100 feet. The wave rushes over the land with terrible force and destructiveness. The earthquake which destroyed Lisbon in 1755 was accompanied by a prodigious tidal wave. By the earthquake wave caused in 1883 during the eruption of Krakatoa in the Strait of Sunda, a water wave was generated which rose from 50 to 80 feet, upon the neighboring lowlands, drowning thousands of people, and carrying a large vessel inland a distance of a mile and a half, leaving it stranded 30 feet above sea level. By an earthquake wave, June 15, 1896, a part of the coast of Japan was devastated for a distance of 175 miles, 27,000 lives were lost, and 60,000 people made homeless. The Messina earthquake of 1908 was accompanied by waves which reached a height of 30 feet and submerged the low-lying portions of the coasts of Sicily and Italy. See EARTHQUAKE.

Bibliography. Vallès, *Études sur les inondations, leurs causes et leurs effets* (Paris, 1857); *United States Engineer's Report* (Washington, 1875); *Mississippi River Commission Reports* (ib., 1882–92); Von Sonklar, *Von den Ueber-*

schwemmungen (Leipzig, 1883); *Montreal Flood Commission Report* (Montreal, 1890); Williams, *On Some Effects of Land Floods in a Tidal River* (London, 1891); "Storm Waves on the Great Lakes and the Ocean," in *Monthly Weather Review* (Washington, 1895); *Work of the Weather Bureau in Connection with the Rivers of the United States* (ib., 1896); Stoney, *Extraordinary Floods in Southern India* (London, 1898); Horton and Jackson, "The Ohio Valley Flood of March–April, 1913," United States Geological Survey, *Water Supply and Irrigation Papers*, No. 334 (ib., 1913).

IN'UUS. See Macaque.

INVAGINATION OF THE INTESTINES. See Intussusception.

INVALIDES, ăN'vȧ'lēd', Les (Fr., invalids). Wounded veterans of the French army, maintained at the expense of the state. The Hôtel des Invalides is an establishment in Paris where a number of these old soldiers are quartered. The institution was founded by Louis XIV in 1670. In 1811 it was reorganized; in 1832 its property was alienated and the institution made a charge upon the annual budget. The hôtel can accommodate 6000 men, but the actual number of inmates is now much smaller. The buildings of the Invalides comprise the hôtel proper, the chapel, and the dome. The hôtel is an immense edifice of many courts and wings, grandiose in plan but commonplace in detail, the work of Levau and Bruand. A considerable part of the ground story is devoted to the unsurpassed National Museum of Artillery and an Historic Museum, chiefly military, and certain other portions to various services of the Ministry of War. Through the vast central court, entered from the Place des Invalides through a lofty portal of ineffective design, one passes to the chapel of St. Louis, by Levau and J. H. Mansart. This is a dignified but cheerless edifice, in three aisles with galleries, vaulted in stone and hung with battle flags. Mass was formerly celebrated here daily with military pomp by such of the Invalides as were able to attend. Beyond and built against it, and fronting south, is the Dome des Invalides, built by J. H. Mansart in 1693 as a royal sepulchral chapel, the finest domed edifice in France. Over the intersection of the arms of a Greek-cross plan inscribed in a square, rises the central dome, about 70 feet in diameter. This is built in three shells—an inner shell of stone with a large oculus, an intermediate shell of stone, and an outer shell of wood covered with lead, surmounted by a spirelike lantern. In 1861 the remains of Napoleon Bonaparte were transferred to the crypt of the dome (remodeled for this purpose by Isabelle and Visconti), and laid in a sarcophagus of porphyry. A circular opening in the floor of the crossing exposes the tomb to view.

IN'VALIDING (from *invalid*, Fr. *invalide*, invalid, from Lat. *invalidus*, not strong, from *in-*, not + *validus*, strong, from *valere*, to be strong). In military phraseology a soldier is said to be invalided when he is sent home from abroad, as a result of climate, wounds, or other causes rendering him unfit for duty. In the United States he would be sent to a general hospital (see Hospital), where it would be decided whether he remained in the army or be returned to civil life. English soldiers are sent to Netley Hospital for similar treatment and final disposition.

INVAR, ĭn-vär'. An alloy of nickel, 36 per cent, and steel, with 0.2 per cent of carbon, discovered by C. E. Guillaume, of the International Bureau of Weights and Measures, near Paris, useful in instruments for exact measurement and other scientific work, on account of its low coefficient of linear expansion practically negligible for most purposes. This alloy has found application for wires and tapes used in geodesy for the measurement of base lines with a high degree of accuracy, and also in the form of bars for standards of length and for comparators and similar instruments of precision. In the United States Coast Survey invar tapes have been used since 1905 with considerable success, as they permit of the rapid and economical measurement of base lines with greater accuracy than with the steel tapes or bars previously employed. These tapes resemble nickel rather than steel in their appearance, being soft, bending easily, and being much less elastic than steel. They do not oxidize as readily, and, while their tensile strength is less than steel, it is greater than is necessary for the measurement of base lines. The coefficient of expansion per unit length per degree Centigrade, in the specimen tested by the United States Geological Survey, varied from 0.000,000,37 to 0.000,000,44 as compared with 0.000,011,4 for a steel tape of similar use. See Geodesy.

Bibliography. Consult: C. E. Guillaume, *Recherches sur le nickel et ses alliages* (Paris, 1898); id., *Les applications des aciers au nickel* (ib., 1904); O. B. French, "Six Primary Bases Measured with Steel and Invar Tapes," in United States Coast and Geodetic Survey, *Report for 1907*, Appendix No. 4 (Washington, 1908).

INVA'RIABLE PLANE. In the solar system, a plane about which the planets' orbits perpetually oscillate, deviating from it only to a very small extent on either side. This plane passes through the centre of gravity of the solar system and is so situated that if all the planets be projected on it, and if the mass of each planet be multiplied into the area which is described by the planet's projected radius vector in any assumed unit of time, the sum of such products will be a maximum. The most recent determination of the position of the invariable plane is that of See, who finds that the inclination to the ecliptic, and the longitude of the ascending node, are 1.5855° and 106.1463° (epoch 1850), respectively. Such a plane is not peculiar to the solar system, but must exist in all systems where the bodies are acted on by their mutual attraction only. Consult Grant, *History of Physical Astronomy* (London, 1852).

INVA'RIANT. See Forms.

INVAR TAPES AND WIRES. See Geodesy; Invar.

INVA'SION (Lat. *invasio*, attack, from *invadere*, to invade, from *in*, in + *vadere*, to go, connected with OHG. *watan*, Ger. *waten*, AS. *wadan*, Eng. *wade*). The act of entry into an enemy's territory as an act of war. In ancient and mediæval times, when an army invaded a country, pillage, devastation, and slaughter were the rule. It was not until the War of the Spanish Succession that Marlborough and Villars, by a system of contribution, introduced comparative humanity into the conduct of armies. The Prussians and Austrians during the wars of Frederick the Great were generally dependent upon regularly levied supplies. During the Revolutionary War the British government declared it to be a right of war: (1) to demand provisions and raise contributions, enforceable, if necessary, by the sword; (2) to ravage territory where there was no other way to bring an enemy to engagement or terms; (3) to treat all rebels as enemies. The right to ravage has not been asserted or acted upon since by either country, except in the case of the burning of the capitol and other buildings at Washington by the British in 1814, which was an unjustifiable violation of the laws of war. Napoleon enforced the principle that war must pay for war, and after the battle of Jena the exaction required of Prussia was more than 100,000,000 francs. The levy of 5,000,000,000 francs on France by Prussia at the end of the Franco-Prussian War in 1870 was the price paid to the invaders. The violation of the neutrality of Belgium by Germany in 1914 (see WAR IN EUROPE) aroused the strongest indignation all over the world and led to the entrance of Great Britain into the conflict.

The rights of an invader in the country occupied by him are important, but these rights of belligerent occupation, which are confined to the districts actually dominated by the invading force, must be carefully distinguished from those of conquest. The invaders' military rule in general supersedes the civil authority. In relation to property a sharp distinction must be drawn between public and private property. As to the former also the invader's rights are held to differ with its character. Thus the contents of the Palatine libraries were carried off to Rome during the Thirty Years' War, and Napoleon filled the Louvre galleries from every capital of Europe; but the rule is now well established that public money, military stores, and public buildings are lawful sources of plunder; public estates may be occupied, and the rents and profits therefrom appropriated; telegraph and railway property pressed into service, and public edifices interfering with military operations destroyed; but property not contributing to the uses of war must remain intact. The removal by the Germans of the astronomical instruments from the Observatory of Peking during the recent expedition of the allies against the Chinese capital was a violation of this rule.

The attitude of an invader towards private persons and property has been clearly defined by international law. Pillage is strictly forbidden. Private persons taking no part in the conflict are to remain unmolested, but inhabitants of an invaded district aiding their country forfeit protection and are subject to military execution, though the interests of humanity are conserved by this distinction between soldier and noncombatant. Property movable and immovable is to remain uninjured. If needed by the hostile army, the invading general may require its sale at prices fixed by himself, or even on occasions require their contribution without payment; but marauding must be checked by discipline and penalties. Such forced contributions of food, forage, labor, wagons, railroad rolling stock, or other means of transportation are called requisitions. See CONTRIBUTION; CONQUEST; and also INTERNATIONAL LAW and the authorities there referred to.

INVEC'TA ET ILLA'TA (Lat. nom. pl., carried in and borne in). An expression of the civil law, found also in the law of Scotland, to denote all things which a tenant has brought upon the premises, as his household furniture, tools, utensils, etc., and which are subject to the lien, or tacit mortgage, of the landlord for the rent of the premises. The English and American legal system in general recognizes no such lien, the landlord's remedies being confined to distress (q.v.) and to an action at law for the rent due.

INVECT'ED (from Lat. *invectus*, p.p. of *invehere*, to carry in, from *in*, in + *vehere*, to carry). In heraldry (q.v.), a partition line the reverse of engrailed.

INVEN'TION (Lat. *inventio*, finding out, from *invenire*, to find, from *in*, in + *venire*, to come). Literally, the act of making something not before made; also, the new thing produced. In patent law the term "invention" is specifically applied to any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, which when invented may under certain conditions be made the subject of the rights of a letter patent. In Great Britain the patent law expressly restricts such inventions to a "new manufacture," but the courts have construed this term so that it includes the four classes of inventions above named. Although it has been held that in the patent law "discovery" and "invention" are synonymous, in popular language and generally in legal literature the term "invention" has come to be used to designate a "patentable" invention or one that is "new" and useful.

To constitute an invention in this sense there must be a creating or origination of some useful thing that did not exist before, by means of an operation of the intellect. The extent of research and the simplicity or complexity of the result are of no importance, if the invention be new and useful and be something more than a construction following the beaten track of mechanical experience. Neither is any distinction made as to degree of usefulness or the amount of mechanical skill involved in the construction or making of the invention, so long as the usefulness or skill be not so slight as to make it negligible. It is no objection that the inventor was aided or assisted by ideas derived from others, so long as the final concrete product be something more and distinct from any one or all of these ideas or suggestions. The difficulty in drawing the line as to what is and what is not an invention is great. Mere simplicity is no objection and, indeed, may constitute the real excellence and newness of the invention. Neither is the use or application of old devices or machines an objection, for most patents are issued upon inventions based partly upon preexisting inventions. A mere advance or extended application of an original invention, changed only in degree and doing substantially the same thing in the same way by the same means, but with better results, is not an invention. There must be a new idea grafted upon the old invention. By reason of the difficulty here referred to the law is liberally applied to protect everything that might be properly called new and useful. See PATENT, and consult the authorities there referred ~~to.~~

INVENTION. A musical term applied by J. S. Bach to a collection of 15 short piano pieces for two voices. In the very verbose title of the original edition Bach explains that he uses the term in the sense of "musical idea" or "theme," and that the object of the pieces is to show a proper development after the theme has once been "invented." The term has never been used by any other composer, nor again by Bach himself, who gave to a collection of 15 other pieces, identical in character and development, but for three voices, the title *Sinfonien*.

INVENTION OF THE CROSS. See Cross, Invention of the.

IN'VENTORY (from Lat. *inventarium*, list, from Lat. *invenire*, to find, from *in*, in + *venire*, to come; connected with Gk. *βαίνειν*, *bainein*, Skt. *gam*, to go, and ultimately with Eng. *come*). A written instrument setting forth in the form of a systematic schedule all the goods, chattels, and other personal property of a person or estate, whether for use in a legal proceeding or for ordinary commercial purposes. The term and the legal practice connected with its use originated in the reform of the Roman law instituted by Justinian to relieve the heir of a deceased person from his personal liability. In order to relieve the heir, and at the same time to protect creditors and legatees, a law was enacted under which the heir was relieved of all liability for the debts and legacies of his ancestor, excepting in so far as the property inherited by him would enable him to discharge the same, provided that within a certain time he should duly prepare and file a written instrument containing a correct enumeration of all property, real and personal, left by the deceased. See Heir.

Until about two centuries after the Norman Conquest the identification of heir and ancestor was as complete under the English law as it had been under the Roman. About that time, partly through the influence of the Roman law, the heir's liability was limited to the amount of property descending to him; executors or administrators superseded him for the purpose of administration of his ancestor's personal estate, and the Roman practice of making an inventory of the assets of the estate was introduced. This plan was probably adopted more for the practical advantage of compelling the personal representatives of the deceased to commit themselves at the outset as to the amount and character of property coming into their hands, than as a means of relieving the heir from liability, as that reform had apparently already been accomplished. The ecclesiastical courts assumed jurisdiction of estates, and inventories of the personal property were required to be filed in these courts, where they were open to the inspection of all persons interested therein. This practice is substantially followed to-day. The inventory usually contains a list of all the personal property of the decedent, with the appraised value set opposite each item, as well as a schedule of his debts and liabilities, the executor or administrator certifying by oath or affirmation that the whole is true to the best of his knowledge and belief. It is filed in the court having jurisdiction of decedents' estates and may be examined by the heirs, next of kin, legatees, and creditors of the deceased, who may object to it if anything is omitted or improperly entered. After the inventory is filed, the executor or administrator becomes accountable for the disposition or distribution of every item set forth therein, and it is therefore a most efficient means of insuring the honest administration of estates.

The term "inventory" is also properly employed to designate the lists of assets prepared by the trustees of bankrupts' or insolvents' estates, and by guardians of infants or other legally incompetent persons, for the information of the court having jurisdiction over them and for the more convenient discharge of their fiduciary duties. See Estate; Executor.

IN'VERA'RAY. A royal and municipal borough, the county town of Argyllshire, Scotland, at the mouth of the Aray in Loch Fyne, 45 miles northwest of Glasgow (Map: Scotland, C 3). An obelisk commemorates the death of 17 Campbells, who were hanged here without trial, in 1685, for their adherence to Presbyterianism. Inveraray Castle, the seat of the dukes of Argyll, is close to the town. Fishing for herring is the chief occupation. Pop., 1901, 678; 1911, 533.

IN'VERCAR'GILL. The capital of the County of Southland, South Island, New Zealand, on an estuary called the New River Harbour, 17 miles from its port at the Bluff (Map: New Zealand, South I., B 7). New River Harbour at the town takes vessels drawing 10 feet. The Bluff has a good harbor, with wharfage for vessels of any tonnage, and is a port of call for the Melbourne and New Zealand mail steamers. The Bluff is 150 miles southwest of Dunedin, with which it is connected by rail. Its industries include numerous woolen mills, saw mills, flour mills, breweries, and meat-refrigerating establishments. It is the centre of a large agricultural and cattle-raising country, and a large export trade has grown up in wool, timber, and grain. The town is well built on a rectangular plan, has government buildings and a hospital. It is lighted by gas and has street tramways. The first settlement of Invercargill was begun in 1857. Pop., 1901, 9950; 1911, 12,782, (with suburbs) 15,858.

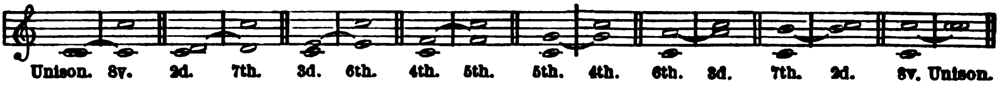
INVERLOCHY, ĭn'vẽr-lŏk'ē. A castle in Inverness-shire, near which, on Feb. 2, 1645, an army of about 2000 under Sir Duncan Campbell was routed and for the most part cut to pieces by an army numbering scarcely 1500 under the Marquis of Montrose (q.v.). The castle is now in ruins. Consult Gardiner, *History of the Great Civil War*, vol. ii (London, 1886–91). See Graham, James.

IN'VERNESS'. A town in Inverness Co., Cape Breton Island, Nova Scotia, Canada, situated on Big River and on the line of the Inverness Railway and Coal Company, about 150 miles by rail from Sydney and 61 miles by rail from Point Tupper. The colliery of the Inverness Railway and Coal Company is situated here. Copper, gypsum, and fire clay are found in the vicinity. Pop., 1911, 2719.

INVERNESS. A royal, parliamentary, and municipal burgh and seaport, the county town of Inverness-shire, Scotland, on both banks of the Ness, near its embouchure in the Moray Firth, 118 miles north of Perth. The Caledonian Canal empties into the Ness at Inverness (Map: Scotland, D 2). The town, picturesquely surrounded by wooded hills, has handsome wide streets and many beautiful residences. Its principal buildings are St. Andrews Episcopal Cathedral, the county hall, public library, observatory, infirmary, lunatic asylum, and Royal Academy. Other features are the fountain, containing the famous blach-na-cudain, long regarded as the town palladium; the suspension bridge, and the Islands promenade. It has a high school, a school of science and art, and an institute for the blind. There are iron foundries, shipbuilding yards, woolen manufactures, distilleries, tanneries, soap and candle factories, nurseries, saw mills, granite works, railway shops, breweries, and thread-making and bleaching works. The harbor, docks, and roads afford good accommodations, and a considerable trade is carried on. The town owns its own gas works. Inverness is of great antiquity, having been one of the Pictish capitals. William the Lion gave it four charters and made it a royal burgh. In 1411 it was burned by Donald of the Isles. The old castle where Macbeth murdered Duncan was razed by Malcolm Canmore, who replaced it by another which was destroyed by Prince Charles Stuart in 1746. The remains exist at the north of the town of the citadel which was built by Cromwell in 1652, and which was demolished at the Restoration. Pop., 1901, 23,075; 1911, 22,216. Consult: Mackintosh, *Invernessiana* (Inverness, 1875); Anderson, *Inverness before Railways* (ib., 1885); Grant, *The Commissariat Record of Inverness* (Edinburgh, 1897).

INVERNESS-SHIRE. The largest county of Scotland, in the northwest division (Map: Scotland, D 2). It includes several of the western islands, viz., Skye, Harris, North and South Uist, Barra, etc., and is bounded east by the counties of Aberdeen, Banff, Elgin, and Nairn; south by Perth and Argyllshire; west by the Atlantic Ocean; and north by Ross-shire and Cromarty. Area, 4211 square miles, most of which, except the valley of the Ness, is barren heath. The county consists chiefly of deer forests, which are rented as hunting ranges. It has valuable coast fisheries. Inverness, the county seat, is the only town. Pop., 1901, 90,104; 1911, 87,270. Consult J. C. Lees, *History of the County of Inverness* (Edinburgh, 1897), and *Records*, edited by Mackay and Boyd, vol. i (Aberdeen, 1911).

INVER'SION (Lat. *inversio*, from *invertere*, to turn about, from *in*, in + *vertere*, to turn). In music this term is applied to intervals, chords, and phrases or passages. An interval is said to be inverted where the position of its two notes is reversed by transposing one of them an octave higher or lower. The inversion changes the name and to some extent the character of the interval. The name or number of an inverted interval will be found by subtracting its original number from nine. Thus, a unison inverted becomes an octave, a second becomes a seventh, a third becomes a sixth, and so on, as shown in the following table of inversions:



By inversion major intervals become minor, and minor become major; diminished intervals become augmented, and augmented become diminished. But the two perfect intervals of the fourth and the fifth remain perfect when inverted. In these examples the transposed note is placed an octave higher, but naturally the same result is arrived at by transposing it downward, as will be seen by reading the table backward. For inversion of chords, see Harmony, *Chords*. For inversion of phrases or passages, see Counterpoint.

INVERSION, in Mathematics. See Circle.

INVERT'ASE (from *invert*). One of the enzymes (see Enzyme) which acts upon certain sugars, especially upon cane sugar (saccharose), which it hydrolyzes, forming grape sugar (glucose) and fruit sugar (fructose). Invertase acts most rapidly at 50° to 60° C. in a slightly acid medium. It can break up practically unlimited quantities of the sugar without being itself materially diminished. Invertase occurs in many fungi and in some bacteria; more recently it has been found widely distributed in the seed plants, in whose nutritive work it plays an important part, because cane sugar is probably one of the most widely distributed foods in the higher plants. Invertase is secreted abundantly by yeast, and without it yeast is unable to ferment cane sugar. After inversion of cane sugar the products are broken up by the enzyme zymase (q.v.). See Enzyme; Fermentation.

INVER'TEBRA'TA (Neo-Lat. nom. pl., from Lat. *in-*, not + *vertebratus*, vertebrate, from *vertebra*, joint, from *vertere*, Skt. *vart*, OChurch Slav. *vrŭtĕti*, to turn, Goth. *wairþan*, AS. *weorþan*, OHG. *werdan*, Ger. *werden*, to become). Animals which do not have a vertebral column or spine. The term is used in contrast with Vertebrata (q.v.), or animals with a backbone. One group, then, is formed on positive and the other on negative characters. Before the anatomical structure and the embryological development of animals was very generally worked out, the barrier between invertebrates and vertebrates was supposed to be absolute; but with the refinement of anatomical and embryological methods of study, brought about in a great measure by the use of the microscope, the hiatus between them is nearly bridged over. Ascidians are now considered to be degenerate ancestors of vertebrates; some of the nemertean and chætopod worms approach vertebrates in certain characters, and *Balanoglossus* and *Cephalodiscus* (q.v.) are frequently called hemichordata (see Adelochorda), because they are so near the boundary line between vertebrates and invertebrates that they can be said to be only half vertebrates. And not only has this barrier been broken down, but, with our increased knowledge, the absolute independence and isolation of many different groups of invertebrate animals which the earlier systematists believed to exist must be abandoned. The foundation of the zoölogy of these animals, as there defined, was laid by Lamarck (q.v.) in a monumental work, *Système des animaux sans vertèbres*, published in Paris in 1801; followed in 1815–22 by his *Histoire naturelle des animaux sans vertèbres*.

Bibliography. Von Siebold, *Anatomy of the Invertebrata* (Boston, 1874); Shipley, *Zoölogy of the Invertebrates* (London, 1893); Bumpus, *Laboratory Course in Invertebrate Zoölogy* (2d ed., New York, 1893); McMurrich, *Textbook of Invertebrate Morphology* (ib., 1894); Brooks, *Handbook of Invertebrate Zoölogy* (Boston, 1897); Böhmig, *Die wirbellosen Tiere*, vols. i–ii (Leipzig, 1909–11); Lang, *Handbuch der Morphologie der wirbellosen Tiere*, vols. i–iv (Jena, 1912–13); Rosalie Lulham, *Introduction to Zoölogy with Directions for Practical Work (Invertebrates)* (New York, 1913); G. A. Drew, *Laboratory Manual of Invertebrate Zoölogy* (2d ed., Philadelphia, 1913).

INVEST'ITURE (Lat. *investitura*, from *in-*

vestire, to invest, from *in*, in + *vestire*, to clothe, from *vestis*, garment; connected with Gk. *ἐννύναι*, *hennynai*, Skt. *vas*, Goth. *wasjan*, OHG., AS. *werian*, Eng. *wear*). In feudal and ecclesiastical history, the act of giving corporal possession of a manor, office, or benefice, accompanied by a certain ceremonial, such as the delivery of a branch, a banner, or an instrument of office, more or less designed to signify the power or authority which it was supposed to convey. The chief interest is in ecclesiastical investitures, and the contest which arose concerning them is so interwoven with the whole course of mediæval history that a brief account of its nature and origin is indispensable to a right understanding of many of the most important events of that period. The system of feudal tenure had become so universal that it affected even the land held by ecclesiastics, and attached to most of the higher ecclesiastical dignities, monastic as well as secular. Accordingly ecclesiastics who, in virtue of the ecclesiastical office which they held, came into possession of the lands attached to such offices, were regarded as becoming by the very fact feudatory to the suzerain of these lands; and, as a not unnatural result, the suzerains thought themselves entitled to claim, in reference to these personages, the same rights which they enjoyed over the other feudatories of their domains. Among these rights was that of granting solemn investiture. In the case of bishops, abbots, and other Church dignitaries, the form of investiture consisted in the delivery of a pastoral staff or crosier, and the placing of a ring upon the finger; and as these badges of office were emblematic—the one of spiritual care of souls, the other of the espousals, as it were, between the pastor and his church or monastery—the possession of this right by the lay princes, which they had held since the time of Charles the Great, became in the latter part of the eleventh century a source of disquietude to the Church. On the part of the suzerains it was maintained that they did not claim to grant by this rite the spiritual powers of the office, their functions being solely to grant possession of its temporalities, and of the rank thereto annexed. But the Church party urged that the ceremonial involved the granting of spiritual powers; insomuch that, in order to prevent the clergy from electing to a see when vacant, it was the practice of the emperors to take possession of the crosier and ring until it should be their own pleasure to grant investiture to their favorites. The investiture strife was complicated by the rebellions of the nobles in Germany; by the strife between rival parties in the Lombard cities; by the conflict of parties in Rome; and specifically by the question of the property of Countess Matilda of Tuscany. (See MATILDA; GERMANY; HENRY IV.) The disfavor in which the practice of investiture was held by the clergy found its most energetic expression in the person of Pope Gregory VII, who, having in the year 1074 enacted most stringent measures for the repression of simony, proceeded in 1075 to condemn, under excommunication, the practice of lay investitures, as almost necessarily connected with simony or leading to it. This prohibition, however, only regarded investiture in the objectionable form in which it was then practiced, or investiture of whatever form, when the office had been obtained simoniacally. But other members of the clergy went much further, and a pope of the same century, Urban II (1095), absolutely and entirely forbade, not alone lay investiture, but the taking of an oath of fealty to a lay suzerain by an ecclesiastic, even though holding lands of him by the ordinary feudal tenure. The contest lasted from 1075 to 1122. In the beginning of the twelfth century it assumed a new form, when Pope Paschal II actually agreed, in 1111, to surrender all the possessions with which the Church had been endowed, and which alone formed the pretext of the claim to investiture on the part of the Emperor, on condition that the Emperor Henry V give up that claim to investiture. This, however, never had any practical effect; but, the other subjects of contention being removed, the contest was finally adjusted by the celebrated Concordat of Worms in 1122, by the terms of which the Emperor agreed to give up the form of investiture with the ring and pastoral staff, to grant to the clergy the right of free elections, and to restore all the possessions of the Church of Rome which had been seized either by himself or by his father; while the Pope, on his part, consented that the election should be held in the presence of the Emperor or his representative; that investiture might be given by the Emperor, but only *by the touch of the sceptre;* and that the bishops and other Church dignitaries should faithfully discharge all the feudal duties which belonged to their fief.

For the investiture troubles in Germany, consult Mirbt, *Die Publizistik im Zeitalter Gregors VII.* (Leipzig, 1894); in England, Böhmer, *Kirche und Staat in England und in der Normandie im XI. und XII. Jahrhundert* (ib., 1899); for those in France, Ibach, *Der Kampf zwischen Papsttum und Königtum von Gregor VII. bis Calixtus II.* (Frankfort, 1884), and Imbart de la Tour, *Les élections épiscopales dans l'église de France du IXème au XIIème siècle* (Paris, 1891).

INVIN′CIBLE ARMA′DA. See ARMADA.

INVINCIBLE DOCTOR, THE (Lat. *Invincibilis Doctor*). A name given to the English theologian William of Occam, on account of his logical methods of argument.

INVINCIBLES (Lat. *invincibilis*, unconquerable, from *in-*, not + *vincibilis*, conquerable, from *vincere*, to conquer). Members of a secret Irish society composed of some of the most desperate spirits of the Fenian association. Each member was acquainted by name with but two others—the one who nominated him to membership and the one whom he in turn nominated. The chief was a mysterious person known simply as No. 1. The object of the society was the assassination of officials, and to its members was charged the murder of Lord Frederick Cavendish, the newly appointed Irish Secretary, and T. H. Burke, the Undersecretary, in Phœnix Park, Dublin, on May 6, 1882. Consult *Annual Register* (London, 1883, 1890). See FENIAN SOCIETY.

INVI′OLABIL′ITY (Lat. *inviolabilitas*, from *inviolabilis*, inviolable, from *in-*, not + *violabilis*, violable, from *violare*, to violate, from *vis*, Gk. *ἴς*, *is*, strength, violence). In international law, the freedom or immunity which attaches to a greater or less degree to the public vessels and their crews and to the diplomatic agents of one country when within the territory of another state, and also in a very limited degree to merchant vessels in foreign waters. This immunity is extended upon the fiction of exterritoriality (q.v.). With respect to public vessels it does not allow the granting of asylum (q.v.) to criminals or fugitive slaves, but custom seems to have established the right of such vessels to grant hospitality to political refugees who without invitation come to them and ask for protection. This grant of asylum does not give the right to the foreign state to demand the surrender of the political refugee nor to expel the ship from its waters. When the commander of the vessel harbors a criminal, resort must be had to a diplomatic appeal; invasion of the ship is not allowed. Should the vessel, however, be made the headquarters of treason, or aid or assist in insurrection or disorders against the state, such measures as are necessary for self-protection may, of course, be taken. Merchant ships have but a slight degree of inviolability, such as that which permits them to regulate their internal discipline by their home laws, certain restrictions on the right of search, etc.

From the earliest times envoys or others sent on diplomatic errands from one state to another have been held sacred or inviolate in their persons during their stay. While this has been the general rule, the modern uniform observance of such immunity, as it now exists among civilized nations, is a late development. Formerly it was neither so extensive, nor was it free from frequent violation.

Inviolability attaches at once upon the entrance of the envoy or minister and extends during his entire residence. While it exists it protects him, his residence and movables, and his suite from the local jurisdiction, civil and criminal. His civil immunity may be waived only by his waiver at the time of his reception, or by his voluntary submission to the jurisdiction of the foreign courts with his sovereign's consent. The residence of the envoy or minister is entitled to absolute immunity from the execution of compulsory process and from all forcible intrusion. He cannot harbor criminals not of his suite, as was the common practice in the Middle Ages; but in barbarous countries and in the South American countries it is customary for asylum to be given to political refugees, although this custom depends rather upon the superior force of the nation represented by the minister than on any general policy of international law. The criminal immunity of a foreign diplomatic agent is suspended only in extreme cases, as when he is party to or aids in plotting or conspiracy against the government to which he is accredited, in which case he compels its authorities to arrest him in self-defense. In ordinary cases of violation of the criminal law his recall is demanded. Consult Hershey, *The Essentials of International Public Law* (New York, 1912), and the authorities noted under International Law.

INVIS'IBLE EMPIRE. See Ku-Klux Klan, The.

IN'VOCA'TION OF SAINTS. See Saints.

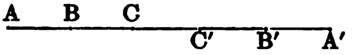
IN'VOICE (probably from Fr. *envois*, pl. of *envoi*, OF. *envoy*, conveyance, a sending, from *envoyer*, OF. *envoyer*, *envoier*, to send, from Lat. *in*, in + *via*, way). A bill of parcels; a statement in detail of the nature, quantity, and price of certain articles. Although the term is used most frequently in connection with sales of goods, an invoice often accompanies a bailment, as when it is sent to a consignee by a shipper of goods, who has retained title in them by the bill of lading (q.v.). In such cases its function is to inform the consignee that the goods invoiced have been shipped to him and may become his upon payment of the prices named in accordance with the conditions named in or accompanying the bill of lading. An invoice is not a document of title, and its possession does not indicate that the holder is the owner of the goods therein described. Nor is it a written contract of sale. It is a mere memorandum, always susceptible of explanation by parol evidence. It may, however, be a sufficient memorandum under the statute of frauds (see Frauds, Statute of) if it contains all the material terms of the oral sale contract and is signed by the party to be charged. Invoices of imported goods are required by the tariff regulations of some countries to be verified before one of their consuls or to be vouched for by him. Consult the authorities referred to under Sale; Bailment.

IN'VOLU'CRE (Lat. *involucrum*, wrapper, from *involvere*, to wrap, from *in*, in + *volvere*, to roll; connected with Goth. *walwjan*, AS. *wealwian*, Eng. *wallow*). As a rule, each flower in a cluster (inflorescence) is subtended by a bract. In case the flowers or their pedicels are close together, the bracts are thrown into a rosette, which is called an involucre. Such inflorescences as the umbel of Umbelliferæ and the head of Compositæ have very characteristic involucres. See Inflorescence.

IN'VOLU'TION AND EV'OLU'TION. In mathematics, the raising to powers and the extraction of roots respectively. The result of taking a number twice as a factor is called the square of the number; the result of taking it three times as a factor, its cube; four times, its fourth power, and so on; e.g., $3 \cdot 3 = 3^2$, or 9 is the square of 3; $3 \cdot 3 \cdot 3 = 3^3$, or 27 is the cube of 3; $a \cdot a \cdot a \cdot a = a^4$ is the fourth power of a. This process is called involution. Evolution is the inverse of involution, or it is the process which undoes involution. The square root of a number is one of the two equal factors of the number, the cube root one of the three equal factors, and so on; e.g., the square root of 16 is either 4 or -4, since $4 \cdot 4 = 16$ and $-4 \cdot -4 = 16$; the cube root of 27 is either 3 or $-3(-\frac{1}{2} \pm \frac{1}{2}\sqrt{-3})$, since each of these cubed equals 27. The nth root of a perfect nth power is one of the n equal factors of that power. A number which is not a perfect nth power has not n equal factors. It is, however, said to have an nth root to any required degree of approximation. Thus the nth root of m to 0.1 is that number of tenths whose nth power differs from m by less than the nth power of any other number of tenths. The nth root of a is indicated by either $\sqrt[n]{a}$ or $a^{\frac{1}{n}}$. In the case of square root the index of the root is not written in connection with the radical sign; thus, we write $\sqrt{5}$ and not $\sqrt[2]{5}$.

When the number whose root is sought is a perfect power, the process of factoring is one of the most practical methods except the use of tables. In the case of numbers which are not perfect powers, and of certain algebraic expressions, the binomial formula is usually employed where tables are not available. Thus $a^2 + 2ab + b^2$, the square of $a + b$, may be applied to extracting the square root of a number or of an algebraic expression, since the root can always be expressed as a binomial whose square the power contains. The older methods of square and cube root, depending upon the sections of a square and of a cube, were inferior, since they could not be extended to higher roots. The binomial formula is, however, of general application and may be extended so as to extract the *n*th root. The detail of these processes can best be obtained from textbooks. Practically to obtain the square or cube root of a number, reference is usually made to tables of roots or of logarithms, and therefore the subject is taught in the schools less frequently than it was at one time. See LOGARITHM.

In geometry two collinear ranges, three points each, are said to form an involution when the anharmonic ratios (q.v.) of any four, not two pairs of *conjugate* points, is equal to the anharmonic ratio of their four conjugates. Thus, in the figure



A, B, C, C', B', A' form an involution, A, B, C being conjugate to A', B', C' if $(A\ B\ C\ B') = (A'\ B'\ C'\ B)$. This form of involution is due to Desargues (1639). Involutions of higher degrees have been developed by Poncelet (1843) and Möbius (1855).

IO, Ī'ō (Lat., from Gk. Ἰώ). In Greek legend, the daughter of Inachus, King of Argos, and first priestess of Hera at Argos. She was loved by Zeus, who, on account of Hera's suspicions, changed her into a white cow. Hera, having obtained of him the cow as a present, set the hundred-eyed Argus to watch her (according to Æschylus, *Supplices*, 299, it was Hera who transformed Io into a cow). Hermes, by command of Zeus, killed Argus and released her. Hera then sent a gadfly, which pursued Io far and wide, e.g., over the Bosporus, "Oxford," and the Ionian Sea, both of which were said to have been named after her, until in her wanderings she reached Egypt, where she was restored to her original form and became the mother of Epaphus. A somewhat different account of this myth is found in the *Prometheus* of Æschylus. In the early Greek art Io is represented as a cow; about 500 B.C. it became customary to represent her as a maiden with horns on her forehead; later still there is a return to the earlier method. Various attempts have been made to explain the myth by natural phenomena, but none has obtained any general acceptance. Most authorities have regarded her as the moon and have found Argos in the stars. Consult: Engelman, *De Ione* (Halle, 1868); Plew, *Neue Jahrbücher für Philologie*, vol. cii (Leipzig, 1870); P. W. Forchhammer, *Die Wanderungen der Inachostochter Io* (Kiel, 1881); Engelman, in Roscher, *Lexikon der griechischen und römischen Mythologie*, vol. ii (Leipzig, 1890–97); Gustav Mellén, *De Ius Fabula* (Upsala, 1901); C. M. Gayley, *The Classic Myths in English Literature and Art* (2d ed., Boston, 1911).

I'ODATES. See IODIC ACID.

IOD'IC ACID, HIO_3. A crystalline monobasic acid composed of hydrogen, oxygen, and iodine and prepared by boiling iodine with strong nitric acid. It is very soluble in water and acts chemically as a powerful oxidizing agent. The salts of iodic acid are called iodates. Neither iodic acid itself nor the iodates are used practically.

I'ODIDES (from *iodine*, from Gk. *ἰώδης*, *iōdēs*, like a violet, from *ἴον*, *ion*, Lat. *viola*, violet). The salts of hydriodic acid (q.v.). The iodides of potassium, sodium, ammonium, strontium, and zinc are used in medicine. They are extensively employed in the tertiary stages of syphilis, causing the rapid absorption of syphilitic deposits. The iodide of potassium is further beneficial in gonorrhœal rheumatism, in certain joint diseases, in pleurisy, Bright's disease, asthma, and as an expectorant in bronchitis; it is also used in cases of chronic lead and mercury poisoning. The other iodides have much the same effect as that of potassium, and the iodides of sodium and strontium are even believed to be preferable. Overdoses of iodides, and even moderate doses in the case of some people, may give rise to certain symptoms that are collectively known as iodism: there is an eruption on the skin, running at the nose and mouth, sore throat, and even laryngitis and bronchitis. In such cases the dose should be diminished, and, if necessary, the administration of the salt entirely discontinued. Potassium iodide sometimes causes great general depression; if so, it may be replaced by the iodide of sodium or of strontium, or preferably by free hydriodic acid. The iodide of sodium forms an interesting series of crystalline compounds (crystallo-alcoholates) with the alcohols, including wood alcohol, ordinary ethyl alcohol, and propyl alcohol. Iodide of starch is a blue powder prepared by gradually adding starch powder to iodine triturated with some water, until the mass assumes a uniform blue color. It is used in medicine for administering iodine internally. See IODINE.

I'ODINE (from Gk. *ἰώδης*, *iōdēs*, like a violet, so called from the color of its vapor). One of the halogen elements, similar to chlorine and bromine. It was discovered by Courtois in 1812 in the ashes of seaweeds. Its character and properties were investigated by Gay-Lussac in 1814. It occurs chiefly in combination in the iodides and iodates of sodium and potassium, and is thus widely distributed both in the organic and inorganic kingdoms. It exists in sea water, in sea plants and animals, and in mineral springs. Along with lead, mercury, silver, and zinc it occurs in ores from Chile, Mexico, and Spain. It is obtained from seaweeds, especially those thrown up on the north coast of France, the coasts of Spain and Ireland, and the west coast of Scotland, but its principal source at present is the mother liquors of the nitre works in Chile. When the weeds just mentioned are burned (formerly in the open air, now in closed retorts to prevent loss by volatilization), they yield an ash called kelp, which contains from 0.1 to 0.3 per cent of iodine. The kelp is dissolved in hot water, and the solution is evaporated until the bulk of the sodium carbonate contained in it has crystallized out. An excess of sulphuric acid is then added to the mother liquor, and thus hydriodic acid is set free. Manganese dioxide (an oxidizing agent) is now added to the liquor in the distilling apparatus, and thus the iodine is liberated. The product can be readily purified by sublimation, the first and last portions only being very impure. The crude sodium nitrate (caliche) from Peru and Chile contains about 0.2 per cent of sodium iodate. The iodine is extracted from the mother liquors from which the sodium nitrate has been separated by crystallization. These are run into wooden vats lined with lead, and the iodine is precipitated by a mixture of neutral and acid sodium sulphites. The resulting iodine is then washed with water and pressed into thick cakes, which are further purified by sublimation.

Iodine (symbol, I; atomic weight, 126.92) is a grayish-black soft solid, with a metal-like lustre. It has a specific gravity of 4.9 at 60° C., melts at 114.15° C. (237.47° F.), and boils at 184.35° C. (363.83° F.), giving rise to a very heavy violet vapor with a peculiar and penetrating odor. The presence of iodine is best detected by the addition of a little starch, with which it gives a blue coloration. Iodine finds extensive use in the arts, especially in the manufacture of coal-tar colors. Some iodine is used in photography. But the greater portion of the iodine of commerce is employed in medicine, partly in the free state, partly in combination as iodoform, and as the iodides of potassium, sodium, ammonium, strontium, and zinc, all of which are official in the Pharmacopœia. Iodine itself is but little used internally, although repeated small doses of it, in form of the tincture well diluted with water, are often successfully used to stop vomiting. (See Iodides.) Externally, however, iodine is in constant use as a disinfectant, irritant, counterirritant, and parasiticide. The pharmacopœial preparations are: 1. *Compound solution of iodine,* or Lugol's solution; an aqueous solution, 100 parts of which contain 5 parts of iodine and 10 parts of potassium iodide. 2. *Tincture of iodine,* which is a 7 per cent solution of iodine in alcohol. 3. *Iodine ointment,* which contains 4 per cent of iodine, 1 per cent of potassium iodide, 93 per cent of benzoinated lard, and 2 per cent of water. When applied to the skin, the preparations produce a stain, which disappears in time, largely owing to the volatility of iodine; the stain may, however, be readily washed off with potassium cyanide or sodium hyposulphite. As counterirritants the preparations mentioned are used for pleurisy, chilblains, chronic inflammation of the joints, etc. As an antiparasitic, iodine is often used for ringworm, in the form of *Coster's paste,* which is made from 1 part of iodine and 4 parts of wood tar. For the medicinal uses of iodides, see Iodides.

Iodine is but sparingly soluble in water, 7000 parts of water dissolving only 1 part of the element. It is quite soluble in alcohol, and even more freely in ether. But it dissolves with great ease in hydrocarbons, in carbon disulphide, and in chloroform. It is also freely soluble in iodine derivatives of the hydrocarbons and in aqueous solutions of metallic iodides, but its solubility in all such substances is probably due to its supposed capacity for forming with them true chemical compounds. Among the compounds of iodine may be mentioned hydriodic acid and its salts (see Iodides), iodic acid (HIO_3) and its salts, termed iodates, and periodic acid (HIO_4) and its salts, termed periodates. The anhydride or iodic acid is iodine pentoxide. The well-known compound of iodine with nitrogen is mentioned under the latter name. Very interesting are two compounds of iodine with chlorine—viz., the monochloride of iodine, ICl, and the trichloride of iodine, ICl_3, both of which may be prepared by the direct action of chlorine on iodine. The trichloride has been recommended as an antiseptic.

It was mentioned above that iodine volatilizes very readily. The density of its vapor has been studied by Dumas, Victor Meyer, Crafts, and Troost, of Paris. It will be remembered that, according to Avogadro's rule, the molecular weight of a substance equals twice its vapor density referred to hydrogen. Up to about 800° C. iodine vapor is found to be invariably about 127 times as heavy as hydrogen under the same conditions of pressure and temperature. Hence the molecular weight of iodine up to 800° C. is about 254, and as the atomic weight of the element is about 127, the molecule of iodine vapor is considered as made up of two atoms and is represented by the symbol I_2. Above 800° C., however, iodine vapor grows lighter and lighter. At 1000° C. it is only 100 times as heavy as hydrogen; at 1400° C. only 75 times as heavy; and at 1500° C., and under reduced pressure, Crafts found it to be only 66 times as heavy as hydrogen under the same pressure and temperature. This indicates that the molecular weight of iodine vapor gradually diminishes above 800° C., seemingly approaching the limit 127 (i.e., 2 × 63.5), which is the relative weight of single atoms. In other words, the molecules of iodine seem to become gradually dissociated into single atoms, and at some limiting temperature and pressure which have not yet been found, the particles of the vapor would all be single atoms. The phenomenon, which has also been observed in the case of certain other elements, presents considerable interest from many points of view. Van't Hoff thinks that if the chemical elements can at all be decomposed, the method might be like that employed in bringing about the phenomenon just described.

Consult "Untersuchungen über das Jod von Gay-Lussac," in Ostwald, *Klassiker der exakten Wissenschaften* (Leipzig, 1889). See Hydriodic Acid; Iodides; Iodic Acid.

I'ODISM. See Iodides.

IOD'OFORM, or Tri-Iodo-Methane, CHI_3. A chemical compound of carbon, hydrogen, and iodine, analogous to chloroform (q.v.). It is a yellow crystalline substance, having a penetrating sweetish odor and an unpleasant sweetish taste. It is very soluble in ether, moderately so in alcohol, and but very sparingly in water. It melts at 119° C. (246.2° F.) and can be readily distilled in a current of steam, although it undergoes decomposition if distilled alone. It also undergoes gradual decomposition under the action of light. It is produced when iodine comes in contact, in the presence of alkalies, with various organic compounds of the fatty series, such as ordinary alcohol, aldehyde, acetone, etc. Its preparation may be conveniently carried out as follows: Dissolve some caustic soda or caustic potash in alcohol diluted with water; warm this solution gradually, add iodine to it, and separate the precipitated iodoform by filtration. The filtrate contains considerable quantities of sodium or potassium iodide, and sodium or potassium iodate. These may either be recovered entirely, in the form of iodides, or else more alcohol and more caustic soda or potash may be added to the filtrate and a slow current of chlorine passed through it, the iodine of the salts being thus set free to form further quantities of iodoform. Another convenient method of preparing iodoform consists in gradually adding an aqueous solution of sodium hydrochlorite to an alkaline solution of potassium iodide in dilute aqueous acetone. Finally, iodoform may be manufactured by subjecting to electrolysis a solution of potassium iodide and acetone (or alcohol) in water with a current of carbonic-acid gas passing into the solution. The principal use of iodoform is for purposes of antisepsis, disinfection, and local stimulation. It has been demonstrated that iodoform itself really exerts no antiseptic action whatever and is incapable of preventing the development of microorganisms. When, however, it is brought in contact with a wound, the secretions of the latter speedily decompose it, and it is the decomposition products that possess the well-known antiseptic and disinfecting power. Iodoform, in the form of powder, of an ointment, or of its solution in collodion, has been extensively used as an application for syphilitic and tuberculous ulcerations, as well as for sores and wounds of any other kind, but it has been largely superseded by less disagreeable and less poisonous substitutes, such as aristol (q.v.) and xeroform. One of the disadvantages of iodoform is its disagreeable odor. But this may be masked by the addition of some musk, or by dissolving iodoform in volatile camphor oil or in balsam of Peru. Iodoform is rapidly absorbed from raw surfaces, and this sometimes gives rise to symptoms of poisoning, and has even caused death. The symptoms vary in different cases and may include any two or three of the following: quick pulse, fever, collapse, dilated pupils, erythema, hallucinations, and gastrointestinal irritation. The treatment consists in administering stimulants and diaphoretics and sponging the skin with warm water. A substance termed diiodoform has been introduced as a substitute for iodoform. See ACETYLENE.

IOD′YRITE. A silver iodide crystallizing in yellow to greenish hexagonal crystals. It is sometimes found with other silver ores, especially with cerargyrite (q.v.).

IOLA, ī-ō′lȧ. A city and the county seat of Allen Co., Kans., on the Neosho River, 40 miles west of Fort Scott, on the Missouri, Kansas, and Texas, the Missouri Pacific, and the Atchison, Topeka, and Santa Fe railroads (Map: Kansas, G 7). Owing to vast wells of natural gas, the city has grown rapidly and is showing a substantial industrial development. It has immense zinc smelters, cement works, brick plants, foundry and machine shops, and a wholesale trade in groceries, flour, and confections. Noteworthy features are a Carnegie library, a hospital, and a United States Weather Bureau station. Settled in 1857, Iola received a charter as a city of the second class in 1898 and has adopted the commission form of government. It owns and operates its water works, gas, and electric-light plants. Pop., 1900, 5791; 1910, 9032; 1914 (U. S. est.), 10,412.

I′OLAN′THE. An operetta by Sir Arthur Sullivan with libretto by W. S. Gilbert (1882).

I′OLA′US (Lat., from Gk. Ἰόλαος). In Greek mythology, the half brother and charioteer of Hercules (q.v.), whom he assisted in the destruction of the Lernæan hydra (q.v.) and in other contests. For his good offices Megara, the first wife of Hercules, was given to him. He also aided the children of Hercules against Eurystheus, and was worshiped with Hercules at Thebes.

I′OLITE (from Gk. *ἴον*, *ion*, violet + *λίθος*, *lithos*, stone), CORDIERITE, or DICHROITE. A magnesium-iron-aluminium silicate, containing a small amount of water, that crystallizes in the orthorhombic system. It is found in various shades of blue, which is deeper in one direction and more grayish or yellowish in a direction at right angles to the first. (See DICHROISM.) It is transparent to translucent. It occurs in gneiss or granite, but rarely in volcanic rocks. Iolite is found in Bavaria, Hungary, Tuscany, Brazil, and in Ceylon, where crystals of an intense blue color, called saphir d'eau, are found. In the United States dark-blue specimens occur at Haddam and Norwich, Conn. Modern usage employs the name saphir d'eau to the light-blue varieties of this mineral in contradistinction to those showing the darker colors that are commonly known as lynx sapphire. The terms are not strictly exact because of the great variety of shades from pale to deep blue that are classed under one of the two names, iolite and cordierite.

ION, ī′ŏn (Lat., from Gk. Ἴων). A tragedy of Euripides, the chief interest of which consists in Creusa's attempt to poison Ion, who had been brought up in Apollo's temple at Delphi and is given to Creusa and her husband as a son. When detected, Creusa is threatened with death at the hands of Ion, who is finally revealed to her as her son by Apollo. The date of the play is uncertain.

ION. See HELLEN; IONIA.

ION. See DISSOCIATION; IONIZATION; ELECTROCHEMISTRY, GENERAL; SOLUTION; ELECTRICITY; CATALYSIS; ESTERS; ACIDS; ETC.

IONA, ī-ō′nȧ (OI. *Hi*, *Hū*, *I*, island, whence the oldest Latin form, *Ioua*, corrupted in transcription to *Iona*). A celebrated island of the Hebrides; in Irish, Icolmkill. It is situated on the west coast of Scotland, a short distance from Mull and Staffa, and forms part of Argyllshire. It is over 3 miles long, varying in breadth from a mile to a mile and a half. Its area is estimated at somewhat over 2000 acres, of which rather more than a fourth part is under tillage. The soil in some parts is fertile and yields oats, barley, and potatoes in abundance. Dunii, the highest point of the island, is about 330 feet above the sea level. Pop., about 250.

The history of the island begins in the year 563, when St. Columba (q.v.) landed upon Iona with 12 disciples. Having obtained a grant of the island from his kinsman, Conall, King of the Scots, and later from Bruide, King of the Picts, he built upon it a monastery, which was long regarded as the mother church of the Picts and was venerated not only among the Scots of Britain and Ireland but among the Angles of the north of England, who owed their conversion to the missionaries of Iona. From the end of the sixth to the end of the eighth century the monastery of Iona was scarcely second to any monastery in the British Isles. In 838 it became the seat of the Bishop of the Western Isles. The island was several times invaded between the eighth and tenth centuries by the heathen Norsemen, and the buildings were burned and the monks slaughtered. Towards the close of the eleventh century the monastery was repaired by St. Margaret, the wife of King Malcolm Canmore, and was visited in 1097 by King Magnus the Barefooted, of Norway. It was now part of that kingdom and so fell under the ecclesiastical jurisdiction of the Bishop of Man and the Archbishop of Trondhjem. In 1203 the bishops of the north of Ireland disputed the authority of the Manx bishop, pulled down a monastery which he had begun to build in the island, and placed the abbey under the rule of an Irish abbot of Derry. The Scottish church had long claimed jurisdiction in Iona, and before the end of the thirteenth century the island fell under the rule of the Scottish King. Its abbey was now peopled by monks of Cluny, and a nunnery of Austin canonesses was planted on its shores. At the beginning of the sixteenth century the island again became the seat of the bishopric of the isles. No remains of St. Columba's monastery now exist. The most ancient ruins are those of the Benedictine monastery of 1203. St. Oran's Chapel, now the oldest church in the island, may probably be of the latter part of the eleventh century. St. Mary's nunnery is, perhaps, a century later. The cathedral church of St. Mary seems to have been built chiefly in the early part of the thirteenth century. It has a choir with a sacristy on the north side and chapels on the south side; north and south transepts; a central tower, about 75 feet high; and a nave. An inscription on one of the columns appears to show that it was the work of an Irish ecclesiastic who died in 1202. On the north of the cathedral are the chapter house and other remains of the conventual or monastic buildings. The Reilig Oran, or ancient burial ground, is supposed to contain bodies of a number of Irish, Scottish, and Danish kings, but no monuments of these princes now remain. Consult: Reeves, *The Historians of Scotland*, vol. vi (Edinburgh, 1874); James Drummond, *Archæologia Scotica, Sculptured Monuments in Iona and the West Highlands* (ib., 1881); Fowler, *Adamnani Vita S. Columbæ* (Oxford, 1898); Robert Jaffray, *Iona, the Sacred Isle* (New York, 1907); G. C. Trenholme, *Story of Iona* (Edinburgh, 1909).

IONE, ī'ōn. A village in Amador Co., Cal., 40 miles east-southeast of Sacramento, on the Southern Pacific Railroad (Map: California, E 4). It is in an agricultural and coal-mining district and has deposits of clay. The Preston School of Industry is situated here. There are flour mills and a creamery. Pop., 1910, 1551.

IO'NIA, ī-ō'nĭ-ȧ (Lat., from Gk. 'Ιωνία). The ancient name of the small but very fertile district comprising the centre of the western coast of Asia Minor from (approximately) the river Hermus in the north to Mount Latmus in the south, and the adjacent islands of the Ægean Sea (Map: Greece, Ancient, E 2, 3). It received its name from the Ionians, who, according to the mythological account, derived theirs from Ion (see Hellen), the son of Apollo by Creusa, a daughter of a king of Athens. According to the usual tradition they were driven out of the Peloponnesus by the Dorians (q.v.), and removed to Attica, whence bands of them went forth to settle on the coast of Asia, led by Neleus and Androclus, sons of Codrus (q.v.). (See below in the account of the Ionians.) Here in historical times we find a sacred league of 12 cities, whose centre was the *Panionium*, a sanctuary of Poseidon Heliconius on the promontory of Mycale. The 12 cities, beginning at the north, were Phocæa, Clazomenæ, Erythræ, Chios (island), Teos, Lebedos, Colophon, Ephesus, Samos (island), Priene, Myus, Miletus. (See the articles on these cities and islands.) Each city was completely autonomous, though from time to time all united for some common purpose. The cities flourished and sent out many colonies both to the north along the Propontis and the Black Sea, and to the west; thus, Smyrna was occupied by settlers from Colophon and became Ionian. During the seventh century B.C. they suffered from the Cimmerian invasion of Asia Minor and later were involved in wars with the Lydian kings, to whom in the sixth century they seem to have yielded a nominal submission and in turn to have exercised a powerful influence upon Lydian art and life. (See Cimmerians; Crœsus; Gyges; Lydia.) The Persian conquest of Lydia, about 546 B.C., led to the reduction of the Ionian and other Greek cities. (See Cyrus the Great; Persia.) They were left to the government of their own tyrants and merely paid a regular tribute, though nominally under the Satrap of Lydia and Ionia, whose residence was at Sardis. About 500 B.C. the Ionian cities revolted from Persia, at the instigation, said Herodotus, of Histiæus (q.v.). At first successful with the aid of the Athenians, the Ionians burned Sardis (q.v.); but the insurrection collapsed with the naval victory of the Persians at Lade in 494 B.C. and the fall of Miletus in the same year. The aid lent to the Ionians by Eretria (q.v.) and by the Athenians gave Darius Hystaspis (q.v.) a pretext for his onslaught upon Greece. (See Persia; Athens, *History*.) On the defeat of the Persians at Mycale by the Athenians and the Spartans (479 B.C.), the cities of Asia Minor again revolted and joined the Delian League. They remained dependent on Athens until the close of the Peloponnesian War (404 B.C.), when they quickly fell under Persian rule again, especially by the Peace of Antalcidas (q.v.), where they remained till the conquests of Alexander the Great. From this period Ionia shared the fate of the neighboring countries and in 64 B.C. was added to the Roman Empire by Pompey, after the Third Mithridatic War. In later times it was so ravaged by the Turks that hardly any traces of its former greatness are left at present.

The name Ionian was not confined to the Greeks of Ionia. In Greek tradition the mythical ancestor of the Ionians was Ion, son of Xuthus and brother of Achæus. (See Hellen.) In historic times it denoted one of the great divisions of the Greek race, occupying Attica and parts of Eubœa, and most of the islands of the Ægean, as well as the stretch of coast in Asia Minor described at the beginning of this article, and, of course, the colonies sent from these regions. It seems probable that these were the first Greeks known to the East, as their name was adopted by Eastern nations to denote the Greeks. They were distinguished by a dialect distinct from the Dorian and North Greek (see Greek Language), though containing several varieties, and seem also to have possessed greater artistic and literary ability, though also a greater tendency to luxury and ease, and a less vigorous and hardy character. (For the part played by the Ionians in art, see Greek Art, *History*.) It is generally believed that they came from the mainland of Greece and gradually spread over their later territory. The movement may well have begun as early as the twelfth century B.C., but probably received its main impulse from the Dorian invasion and its attendant migrations. (See Dorians.) This view was opposed by E. Curtius, who declared that the Ionians had originally come into Asia

Minor from the north of Asia and had crossed thence to the islands and Attica and Eubœa. More recently Bury, while admitting that the Ionians of history came from Greece, has maintained that the name is derived from the Asiatic tribe which they found in occupation of the coast. Curtius' view, though held by Holm in his *History of Greece*, is now generally discredited, nor is Bury's theory as yet more than an ingenious hypothesis. That the race was composed of many elements cannot be doubted, and indeed was recognized by the Greeks themselves. Herodotus, while defining Ionians as those who traced their origin to Attica and celebrated the festival of the Apaturia (see Greek Festivals), admits that neither Ephesus nor Colophon kept this feast, a fact which seems to indicate a considerable foreign element in these cities. In art, literature, and philosophy, Ionia enjoyed deserved distinction. Her great names are, among others, Mimnermus, Anacreon of Teos, Thales, Apelles, Parrhasius, Zeuxis, and others mentioned under Ionian School. Consult the histories of Greece, especially Ernst Curtius, *Die Ionier vor der ionischen Wanderung* (Berlin, 1855); Eduard Meyer, *Forschungen zur alten Geschichte*, vol. i (Halle, 1892); Georg Busolt, *Griechische Geschichte bis Schlacht bei Chæroneia*, vols. i, iii (2d ed., Gotha, 1893); Ed. Meyer, *Geschichte des Altertums*, vol. ii (Halle, 1894); Bury, in *English Historical Review*, xv (London, 1890); Hogarth, *Ionia and the East* (Oxford, 1909); Lenschau, in *Klio*, xiii (Leipzig, 1913); Pöhlmann, *Grundriss der griechischen Geschichte nebst Quellenkunde* (5th ed., Munich, 1914). See also Diana, Temple of.

IONIA. A city and the county seat of Ionia Co., Mich., on the Grand River, 34 miles east of Grand Rapids, on the Grand Trunk and the Pere Marquette railroads (Map: Michigan, E 5). It is surrounded by a farming region and has car shops of the Pere Marquette System, a pottery plant, gristmill, and reed-furniture, school-furniture, automobile-body, and petticoat factories. The Michigan Reformatory and the State Hospital for Criminal Insane are located here. Ionia was laid out in 1833 and incorporated in 1873. The city owns and operates its water works. Pop., 1900, 5209; 1910, 5030.

IONIAN (ī-ō′nĭ-an) ISLANDS. A collective name given to the islands in the Ionian Sea (together with the island of Cerigo, farther south) belonging to Greece. They consist of six principal and a large number of smaller islands and fall mainly into three groups. The first and northernmost group lies off the west coast of Epirus and consists of Corfu and the little island of Paxos; the second group lies around the entrance to the Gulf of Corinth and consists of Santa Maura, Ithaca, Cephalonia, and Zante; the third group, consisting of Cerigo and its dependent islets, lies southeast of the Morea. The distance from the mainland to Santa Maura, the nearest of the larger islands, is scarcely more than a mile, while the distance to Cephalonia is 22 miles. There is little geographical unity between the islands; for geographical descriptions, see articles on the separate islands. Politically the western groups form the three nomarchies of Corfu, Cephalonia, and Zante, while Cerigo belongs to the nomarchy of Argolis. Their combined area is 1117 square miles, and their population in 1896 was 266,223, and, in 1907, 226,590.

The collective term Ionian is of modern date. After the division of the Roman Empire these islands were included in the eastern half, the Byzantine Empire, and so continued till 1081, when they fell into the power of Robert Guiscard (q.v.). In the thirteenth and fourteenth centuries the possession of the islands was disputed by the Venetians, the rulers of Naples, and the Greek and Italian corsairs of the Mediterranean. In 1386 Venice obtained possession of Corfu, the most important of the islands. By conquest and purchase the other islands of the Ionian group were acquired by the Republic. Cerigo, the last, was taken from the Turks in 1717. The islands were taken by France when Bonaparte extinguished the Venetian Republic in 1797. They were seized by Russia and Turkey in 1798–99, but were returned to France under the arrangement made in the Peace of Tilsit in 1807. Zante, Cephalonia, and Cerigo were seized by Great Britain in 1809, though Corfu did not yield till 1815. The islands were reconstituted a republic under a British protectorate. Austria was allowed equal commercial privileges. The government was composed of the British High Commissioner and an assembly composed of two chambers—the Senate of six, the Legislative Assembly of 40 members. Up to 1848 the press was restricted, and the government was really a despotism, but in that and the following year widespread dislike of the British government became apparent. To remove what were supposed to be grievances, Lord Seaton, then High Commissioner, introduced sweeping changes in the constitution, including vote by ballot, lowering of the franchise, and freedom of the press. A demand was then made for annexation to the Kingdom of Greece, and an insurrection broke out in August, 1849, in Cephalonia. It was suppressed by Sir Henry Ward, who had succeeded Lord Seaton. Fresh concessions were granted, but without appeasing the malcontents. In 1859 Mr. Gladstone was sent as a special commissioner to the islands, and he reported against their cession to Greece. There was no great desire, however, on the part of the British government to continue its connection with the Ionian Islands. They had cost the United Kingdom £100,000 per annum and had been a continual source of annoyance. In 1863 the election of Prince George of Denmark as constitutional King of Greece gave England an opportunity of getting rid of this troublesome dependency. In that year the Parliament of the islands proclaimed their annexation to Greece. On March 29, 1864, a treaty was concluded at London between the five Great Powers, by which this annexation was consummated, and on May 30 formal possession was taken by the Greek authorities. The neutrality of all the islands was at first guaranteed, but later it was made to apply only to the islands of Corfu and Paxo. In February, 1867, the islands were visited by a series of earthquakes, most violent in Cephalonia, where they caused great destruction of life and property and almost destroyed the two chief towns. Since their annexation the islands have suffered a gradual decline.

Bibliography. R. M. Martin, *History of the British Possessions in the Mediterranean Sea* (London, 1837); John Davy, *Notes and Observations on the Ionian Islands and Malta* (ib., 1842);

Edmund Spencer, *Travels in European Turkey, with a Visit to Greece and the Ionian Islands* (ib., 1853); J. D. Gardner, *Ionian Islands in Relation to Greece* (ib., 1859); D. T. Ansted, *Ionian Islands in the Year 1863* (ib., 1863); Emmanuel Rodocanachi, *Bonaparte et les îles ioniennes* (Paris, 1899); Gaston Lévy, *De la condition international des îles ioniennes depuis le congrès de Vienne jusqu'à nos jours* (ib., 1901); Georg Weber, "Zur Topographie der ionischen Küste," in *K. Deutsches Archeologisches Institut, Mitteilungen, Athenische Abteilung*, vol. xxix (Athens, 1904). See GREECE.

IONIANS. See IONIA.

IONIAN SCHOOL. The earliest school of Greek philosophy, represented by Thales, Anaximander, and Anaximenes of Miletus, and Heraclitus of Ephesus. Its chief problem was the search for the first principle in nature, which different exponents of the school found in water, fire, air, or atoms. See GREEK PHILOSOPHY.

IONIAN SEA. The name of that part of the Mediterranean which separates south Italy and Sicily from Albania and Greece (Map: Greece, A 4). It is connected with the Adriatic by the Strait of Otranto. Its main arm is the Gulf of Taranto, between the Calabrian peninsula and that of Otranto, and it forms a number of deep inlets on the coast of Greece, the chief of which is the Gulf of Corinth. The Ionian Islands are located along the eastern margin.

ION'IC DIALECT. See GREEK LANGUAGE, *Dialects;* IONIA.

IONIC MEDICATION. See CATAPHORESIS.

IONIC ORDER. One of the three orders of Greek architecture, so called because it was first used in the Greek (Ionian) cities of Asia Minor. It appears to have been developed during the sixth century B.C. from wooden prototypes no longer extant. Its use in Greece proper was almost wholly confined to Attica, where it appeared first as a distinct style, but was used in conjunction with the Doric as well as independently. (See GREEK ART.) It differs essentially from the Doric by its more slender proportions, carved ornamentation, banded architrave, plain frieze, molded base, and voluted capital. The column is from 7 to 10 diameters high in Greek examples, usually 9 in the Roman, and the shaft has 24 deep narrow flutes, separated by very narrow fillets. There are two types of cornice, one with and one without dentils (q.v.); the first was the universal Asiatic type. For illustration and details of the order, see ORDERS OF ARCHITECTURE. A very beautiful but unique example of the Attic-Ionic order is that of the Erechtheum (q.v.) at Athens. In this the upper part, or necking, of the shaft is enriched by an exquisite band of anthemion ornaments, and the channel of the spiral scrolls of the capital is double, while between the band connecting these and the ovolo there is a torus of braided pattern.

The Ionic order was generally used in the Greek cities of Asia Minor for peripteral temples (as at Ephesus, Priene, etc.), but in Greece proper its use was confined to small prostyle and amphiprostyle buildings (Temple of Wingless Victory, Athens), circular buildings (Philippeum at Olympia), and the interiors of some Doric buildings, as in the Propylæa at Athens and the temples at Bassæ and Tegea. There was, however, a general increasing tendency to use it in Greek architecture. The principal change made by the Romans in its form was in the band which connects the volutes. In the best Greek examples this was curved, but it is straight in the Roman Ionic and in many modern examples.

IONIC SCHOOL. See IONIAN SCHOOL.

I'ONIZA'TION (from *ion*, from Gk. *ἰών*, pres. p. of *ἰέναι*, *ienai*, to go). The modern theory of electric conduction is that an electric current consists of the motion of minute particles of matter which are charged positively and negatively, the motion of the oppositely charged particles being in opposite directions. These charged particles are called ions, and they are in no case identical with molecules; in fact, it rarely happens that a molecule as such is charged. The formation of these ions is called ionization. In metals and all solid conductors there are ions probably always present, the negative ones being electrons. (See ELECTRON.) In a liquid which is not a fused metal, e.g., water, etc., ions are produced by dissolving in it some salt or acid, which dissociates in the act of solution (q.v.). (There are undoubtedly a small number of ions present in the pure liquid, these being fragments of its molecules.) In ordinary gases ions are probably always present to a limited extent, although in a pure dry gas there may be none; but in any case their number may be enormously increased in many ways. If the Röntgen, i.e., X rays (q.v.) are passed through a gas, it is ionized, as is shown by its becoming a good conductor; similarly, if rays from any radioactive substance (see RADIOACTIVITY), or ultra-violet light, or the cathode rays, pass through a gas, it is ionized. The gases from a flame are strongly ionized, so that they will rapidly discharge any electrified conductor near which they are allowed to flow. If a spark is passed between the two terminals of an electrical machine or induction coil, the gas on all sides is found to be ionized; if there is a brush discharge from points, the same is true. By subjecting gas, in which there are only a few ions present, to a very strong electrostatic field, these ions may be given velocities high enough to enable them to break up into ions neutral molecules which they strike in their path; these new ions in turn are set in motion and make more ions, until the number of ions may be enormously increased. This process is called ionization by impact, and has taken place whenever an electric spark occurs. In cases of ionization where no spark passes, the number of ionized atoms is negligibly small compared with the number of neutral atoms, for as soon as the number of ions becomes large, the number of positive and negative ions coming close enough to each other to recombine because of their mutual attraction becomes large, the rate of recombination increasing as the square of the number of positive and negative ions present.

When ions are formed in gases at low pressures they have definite masses, but in gases at atmospheric pressure they seem to collect neutral molecules about them, forming aggregations of varying mass. Negative ions formed in gases at low pressure are identical whatever the gas from which they are formed. The charge of such an ion is the same as the charge of a hydrogen ion in electrolysis, and its mass is about 1/1800 of the mass of a hydrogen atom. This negative ion is the natural unit of electricity, the electron. (See Electron.) It is conceived that the process of ionization consists in tearing an electron away from a previously neutral atom, leaving the remainder of the atom positively charged and forming the positive ion. Positive ions thus vary in mass according to the mass of the atom of the gas in which they originate. A beautiful experimental method of demonstrating the presence of ions in a gas and their motions has been devised by C. T. R. Wilson (*Proceedings of the Royal Society of London*, vol. lxxxvii, p. 277, 1912). It depends upon the fact that drops of water may be condensed upon minute charged particles. Thus, if there are ions in a gas saturated with moisture, a sudden expansion of the gas will chill it and cause drops to form around the ions, and then these drops may be photographed. For a definite fall in temperature, drops will form only on the negative ions; a greater fall is required for the positive ones.

Consult: J. J. Thomson, *Conduction of Electricity through Gases* (2d ed., New York, 1906); C. Barus, *Condensation of Vapor as Induced by Nuclei and Ions* (Washington, 1907–10); J. S. Townsend, *Theory of Ion of Gases by Collision* (New York, 1910); H. Scudder, *Electrical Conductivity and Ionization Constants of Organic Compounds* (ib., 1914). For notable modern work in this field, see papers in the *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* by Gill, Pring and Parker, Barkla and Simons, Owen and Roberts, Campbell, Townsend, J. J. Thomson, Bragg, Gill, Pidduck, Eve, Taylor, Florance, Jacot, Sheard, Barkla and Philpot, Wellisch and Woodrow, Burton and Kilby, and Wheatley, especially vols. xxiii–xxvi, 1912 and 1913. See also Pring's "Origin of Thermal Ionization from Carbon," in the *Proceedings of the Royal Society of London*, 1913, and in the *Transactions of the Royal Society of Canada*, Ottawa, 1912; and Turner, Jones, and Jacobson, in the *American Chemical Journal*, vol. xl, 1908. For further particulars, see also *Electrolysis* under the article Electricity.

ION (ī'ŏn) **OF CHIOS**, kī'ŏs (c.500–c.422 B.C.). A Greek author, who came to Athens when he was still young (478 B.C.). He was a member of the circle which included Cimon and Pericles, and was probably personally acquainted with Æschylus and Sophocles. His only work in prose, so far as we know, was the 'Επιδημίαι, 'Sojournings,' reminiscences of celebrated visitors at Chios, which was of great importance to the Greek historians who succeeded him, and has some value for literary history. The fragments of this work may be found in Müller, *Fragmenta Historicorum Græcorum* (1853). There is also a tradition that he wrote on the colonization of Chios. But his poetry was even more important; he wrote tragedies, lyrics, and elegiac and dithyrambic verse. Consult: Nauck, *Tragicorum Græcorum Fragmenta* (Leipzig, 1889); Allègre, *De Ione Chio* (Lyons, 1890); Theodor Bergk, *Poetæ Lyrici Græci* (Leipzig, 1900); Christ-Schmid, *Geschichte der griechischen Litteratur*, vol. i (5th ed., Munich, 1908).

I'OPHON (c.450–c.390 B.C.). A Greek tragedian, son of Sophocles. We know little of his life or of his plays. There is a statement in Valerius Maximus attributing the *Antigone* to him. The story told by Plutarch, and by Cicero, *De Senectute*, 22, that he accused his aged father of insanity so that he might have control of his property, and that Sophocles proved his sanity by reading to the judges the famous chorus from the *Œdipus Coloneus*, 668 ff., is questioned in modern times, e.g., by Jebb, editor of the *Œdipus Coloneus*, pp. xl–xlii (3d ed., Cambridge, 1900). The few verses of Iophon which survive may be found in Nauck, *Tragicorum Græcorum Fragmenta* (1889). Consult Oswald Wolf, *De Iophonte Poeta* (Leipzig, 1884), and the editors on Aristophanes, *Frogs*, 73, 78.

IORGA, yôr'gȧ, Nicolæ (1871–). A Rumanian historian and politician, born at Botoshani and educated at Iashi, Paris, Berlin, and Leipzig. In 1894 he was appointed professor of universal history at the University of Bucharest, and in 1910 was made a member of the Rumanian Academy. He became leader of the National-Democratic party. His works include, besides political writings, numerous and important publications of documents relating to Rumanian history, and historic monographs such as: *Philippe de Mezières et la croisade au XIVe siècle* (1896); *Notes et extraits pour servir à l'histoire des croisades* (1899–1902); *Geschichte der Rumänen* (1905); *History of the Byzantine Empire* (in English, 1907); *Geschichte des Osmanischen Reiches* (5 vols., 1907–13); *History of Rumanian Literature in the Eighteenth* (1901) *and Nineteenth Centuries* (1902–09), in Rumanian.

I'OS, or **NI'O**. One of the Cyclades, Greek Archipelago, situated about 13 miles south of Naxos (Map: Greece, G 7). Its area is over 45 square miles, and its surface very mountainous. The inhabitants cultivate cotton, olives, and the vine, and raise cattle. The only town, Ios, had a population, in 1907, of 2090. According to local tradition, Homer was buried on the island.

IO'TA (Lat., from Gk. *ἰῶτα*, from Phœnician *yōdh*, Heb. *yōd*, Ar. *yad*, hand). The ninth letter (ι) of the Greek alphabet, corresponding to the English *i*.

I. O. U. (I owe you). A memorandum of debt or due bill, named from its abbreviated form, viz.,

New York, January, 1915.
John Doe, I. O. U. $20.
Richard Roe.

In England and in most of the United States an I. O. U. is not treated as a *promissory note* (q.v.) for the reason that it does not contain an express promise to pay. However, by statute or by judicial decisions, it has been in some States declared to be a promissory note, and as such capable of transfer by indorsement. It can everywhere be sued upon as an account stated, without proof of the origin of the debt. See Due Bill.

IOVILÆ, or **JOVILÆ**, yō'vĭ-lē *or* yō'vĭ-lī. Oscan monuments in Campania, dating from the fifth to the third century B.C., found at Capua and Cumæ. Some of them are dedicated to Jupiter; others were attached to graves. All show heraldic emblems peculiar to a family or a group of families; the inscriptions on them have to do with the performance annually, on fixed days, of certain ceremonies. Consult: R. S. Conway, *The Italic Dialects* (Cambridge, 1897); Von Planta, *Grammatik der oskisch-umbrischen Dialekte* (Strassburg, 1892–97); C. D. Buck, *A Grammar of Oscan and Umbrian* (Boston, 1904); id., *Ele-*

mentarbuch der oskisch-umbrischen Dialekte (Heidelberg, 1906). See the account of the Oscan dialect under ITALIC LANGUAGES.

IOWA, I′ô-wȧ (popularly known as the Hawkeye State). One of the North Central States of the United States. It lies between latitudes 40° 36′ and 43° 30′ N. and between longitudes 89° 5′ and 96° 31′ W. and is bounded on the north by Minnesota, on the east by Wisconsin and Illinois, from which it is separated by the Mississippi River, on the south by Missouri, and on the west by Nebraska, from which it is separated by the Missouri River, and by South Dakota. Its shape is nearly that of a rectangle, measuring 310 miles from east to west and 205 miles from north to south; its area is 56,147 square miles, and it ranks twenty-fourth in size among the States of the Union.

Topography. Iowa is a typical prairie plain with slight relief. The range in altitude is somewhat more than 1000 feet. The lowest point, 494 feet above sea level, is at Keokuk, in the southeast corner of the State; the highest point, the elevation of which is not definitely known, is on a great divide in Osceola County in northwest Iowa. The greater portion, though not perfectly level, is so free from natural obstructions that most of the country roads are laid out in squares, crossing at right angles with the absolute regularity of a checkerboard. The most rugged part is the Driftless Area in the northeast corner of the State. Iowa is divided into two hydrographic systems, the eastern two-thirds being drained by the direct affluents of the Mississippi, and the western third by those of the Missouri. The divide between the two systems runs obliquely across the State from northwest to southeast. From this the Mississippi affluents flow all in a southeast direction, and the Missouri affluents all to the southwest. The principal of the former are the upper Iowa, Turkey, Wapsipinicon, Cedar, Iowa, Skunk, and Des Moines rivers, the last being the largest river within the State. The principal Missouri affluents are the Big Sioux, forming most of the South Dakota boundary, the Little Sioux, the Nishnabotna, and the Nodaway. Many of these streams are navigable for very small craft, but, owing to the railroads, they are unnecessary as waterways and little used. Like all typical glaciated areas, Iowa is dotted, especially in the northern part, with numerous small but often beautiful lakes, several of which are favorite resorts, such as Spirit Lake in Dickinson County near the north boundary, a beautiful sheet of water, 2½ by 5 miles, with picturesque, wooded shores. Other beautiful lakes are East and West Okoboji, Clear Lake, and Storm Lake.

Geology. Owing to the heavy covering of drift, a thorough geological survey of Iowa is attended with difficulties. Nevertheless, our knowledge of the rock formations is fairly complete. In more than three-fourths of the State the surface consists of Paleozoic rocks appearing in parallel belts running northwest to southeast. Beginning at the northeast corner, there is a narrow belt of Cambrian rocks consisting of Potsdam sandstone; then follow the Ordovician, Silurian, Devonian, and Carboniferous systems, the last occupying the southwest corner. The northwestern part is covered by extensive Cretaceous beds deposited across and over the belts of the older strata. In Webster County is a small area of rocks probably of Permian age. Finally, in the extreme northwest corner there are outcroppings of metamorphosed rock of the Algonkian system, known as Sioux quartzite, the oldest formation in the State. Over the entire surface, with the exception of a small driftless area in the northeast corner, is a deposit of glacial drift from a few inches to several hundred feet in thickness. It consists mainly of fine rock fragments with but few bowlders and pebbles.

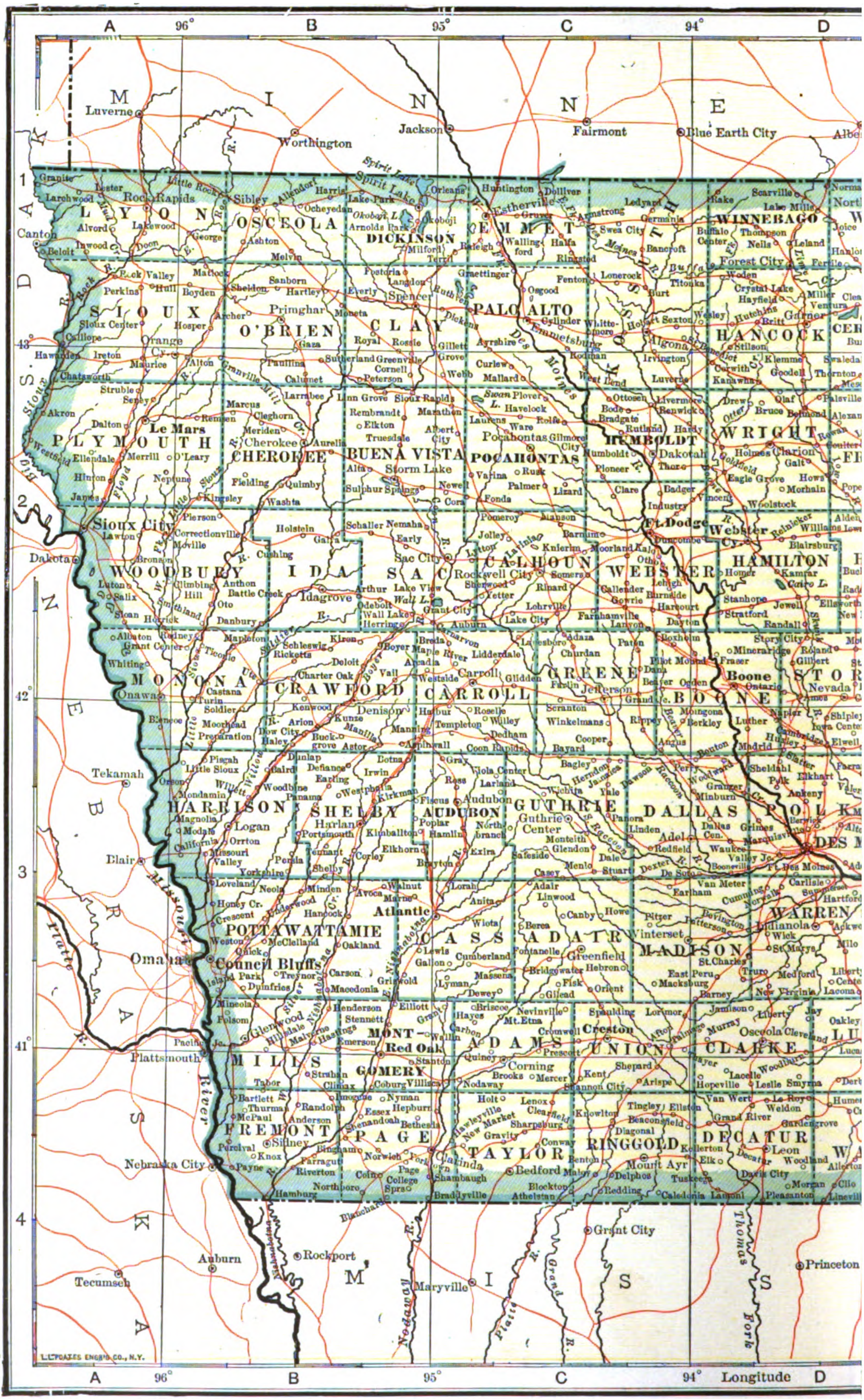
Mineral Resources. The most valuable of Iowa's mineral resources are the extensive bituminous coal beds found in the south-central quarter of the State. Lead and zinc ores have been mined in considerable quantities in the Galena limestone of the Ordovician system of the northeast. Extensive deposits of gypsum and cement materials are also found, and various other minerals occur in smaller quantities. The limestones of the Ordovician, Silurian, and Devonian systems furnish an inexhaustible supply of building stone.

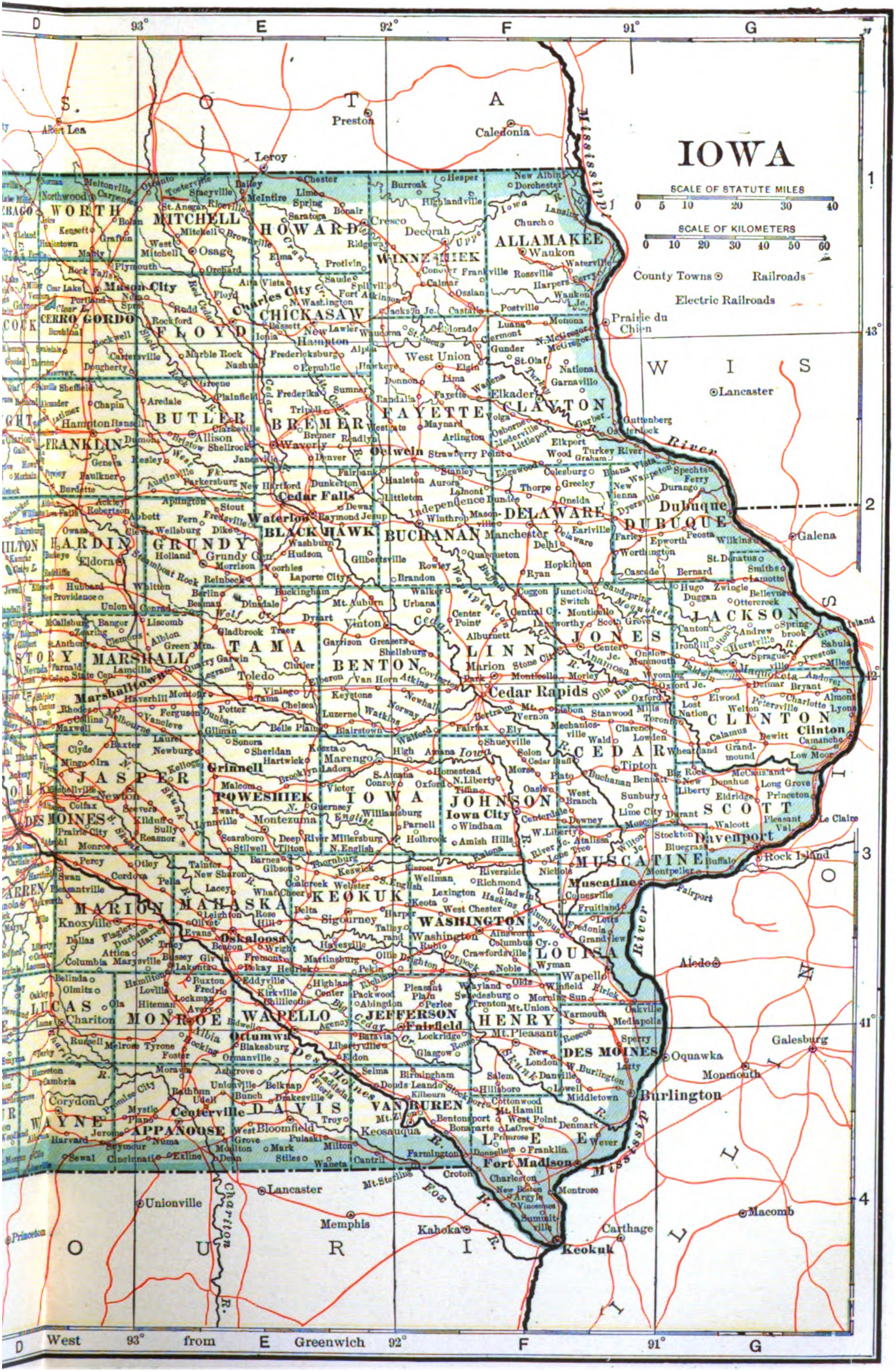
Mining. The principal mining industries are coal mining and clay working, these two contributing about 77 per cent of the total mineral value. Over 60 per cent of the value is represented by the output of coal mines. The coal fields constitute the northern limits of the western interior region and occupy the central and southern portions. They have a total area of approximately 20,000 square miles, of which about 13,000 square miles are considered as workable under present conditions. The coal is of noncoking bituminous grade, somewhat high in sulphur, but is a fair steaming fuel. The market for Iowa coal is largely confined within the borders of the State. The production in 1913 was 7,525,936 short tons, valued at $13,496,710. In that year Iowa ranked eleventh in the production of coal. The industry dates from 1840, but has not shown the same progress as in many Western States.

The value of clay products in 1913 was $5,573,681. The chief products are draintile, in which Iowa holds first place among the States, and common brick. Cement ranks third in importance among mineral products; the output in 1913 was 3,623,674 barrels. In 1913 there were three modern cement plants of large capacity. Iowa ranked second in production of gypsum, the value of which in 1913 amounted to $1,157,939. Large quantities of stone, sand, and gravel are produced. The other commercial products are lead, lime, mineral paints, mineral waters, sand-lime brick, and a small amount of natural gas. The total of the mineral production in 1913 was $25,602,015.

Forest areas are small and are chiefly confined to the faces of the bluffs along the river courses. The most common trees are the oak, elm, cottonwood, hickory, and maple, while scanty forests of pine and cedar are found on some of the bluffs. Grasses are the predominating feature of the landscape as well of the flora of the State.

Climate. The climate in different parts of Iowa shows only slight variations, which are mostly due to differences in latitude and altitude. It is of the continental type, with great variations in temperature between summer and winter. The mean annual temperature is 47.5° F. The highest temperature recorded is 113° F. and the lowest is —43° F., giving the remarkable range of 156° F. The average winter temperature is 20.7° F., spring 47.5° F., summer 71.3° F., and autumn 50.5° F. The average an-


A
96°
B
95°
C
94°
D
1
2
3
4
42°
43°
41°
M I N N E
S. DAKOTA
NEBRASKA
M I S S
Luverne
Worthington
Jackson
Fairmont
Blue Earth City
Canton
Beloit
Dakota
Tekamah
Blair
Omaha
Plattsmouth
Nebraska City
Auburn
Tecumseh
Rockport
Maryville
Grant City
Princeton
Big Sioux R.
Missouri River
Platte R.
Nodaway R.
Grand R.
Thomas Fork
LYON
OSCEOLA
DICKINSON
EMMET
WINNEBAGO
SIOUX
O'BRIEN
CLAY
PALO ALTO
KOSSUTH
HANCOCK
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
WOODBURY
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
MONONA
CRAWFORD
CARROLL
GREENE
BOONE
STORY
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
Rock Rapids
Sibley
Spirit Lake
Estherville
Sioux Center
Primghar
Spencer
Emmetsburg
Algona
Le Mars
Cherokee
Storm Lake
Pocahontas
Humboldt
Sioux City
Ida Grove
Sac City
Rockwell City
Ft. Dodge
Webster City
Onawa
Denison
Carroll
Jefferson
Boone
Nevada
Logan
Harlan
Audubon
Guthrie Center
Adel
Des Moines
Council Bluffs
Atlantic
Greenfield
Winterset
Indianola
Glenwood
Red Oak
Corning
Creston
Osceola
Sidney
Clarinda
Bedford
Mount Ayr
Leon
L.L. POATES ENGR'G CO., N.Y.
Longitude


IOWA
SCALE OF STATUTE MILES
0 5 10 20 30 40
SCALE OF KILOMETERS
0 10 20 30 40 50 60
County Towns ⊙
Railroads
Electric Railroads
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93°
E
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4
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West 93° from E Greenwich 92° F 91° G
S. O T A
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Mississippi
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WORTH
MITCHELL
HOWARD
WINNESHIEK
ALLAMAKEE
CERRO GORDO
FLOYD
CHICKASAW
FAYETTE
CLAYTON
FRANKLIN
BUTLER
BREMER
HARDIN
GRUNDY
BLACK HAWK
BUCHANAN
DELAWARE
DUBUQUE
TAMA
BENTON
LINN
JONES
JACKSON
MARSHALL
STORY
JASPER
POWESHIEK
IOWA
JOHNSON
CEDAR
CLINTON
SCOTT
MUSCATINE
MARION
MAHASKA
KEOKUK
WASHINGTON
LOUISA
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE
Des Moines
Cedar Rapids
Dubuque
Davenport
Iowa City
Burlington
Keokuk
Fort Madison
Waterloo
Cedar Falls
Marshalltown
Ottumwa
Oskaloosa
Muscatine
Clinton

nual rainfall is 31.5 inches, more than two-thirds of which usually falls during the six crop months, April to October. These copious but not excessive rains, coinciding with continued high temperature during the summer months, are, next to the rich soil, the chief cause of Iowa's agricultural prosperity.

Soil. Practically the whole of the State is arable land. The soil may be divided into three distinct kinds: alluvial soil, glacial drift, and loess. The alluvial soil consists of recent deposits on the bottom lands of the principal rivers; the principal tract is the Missouri bottoms, 150 miles long and from 5 to 20 miles wide. This is, of course, the richest soil of the State, but is, nevertheless, rivaled by the drift soil. The latter consists of a fine loamy mixture of clay and sand, with a little gravel. It is of almost inexhaustible richness and scarcely needs fertilizing. It covers by far the greater part of the State. The loess is a fine yellowish silt highly charged with carbonate of lime. It is found in various parts of the State, but is related chiefly to the valleys of the large streams. It is generally considered to be of Æolian origin.

For flora and fauna, see UNITED STATES.

Agriculture. Iowa has been from its earliest settlement one of the most important agricultural States in the Union. It has, however, passed out of the class of States which are adding to their total farm area. In 1910, of an approximate land area of 35,575,040 acres, 95.4 per cent (33,930,688 acres) was in farm land, and the improved land in farms was 29,491,199 acres. In that year the total number of farms was 217,044, and the average acreage per farm was 156.3. The average value of all property per farm was $17,259 in 1910. The average value of land per acre was $82.58 in 1910. Of the total number of farms (217,044), those operated by owners and managers in 1910 numbered 134,929, and those operated by tenants 82,115, i.e., slightly more than three out of eight were operated by tenants. In 1910 the percentage of farm land improved was highest for farms operated by tenants and lowest for farms operated by managers.

Of the total farm acreage in 1910, 50.7 per cent was in farms of from 175 to 499 acres and 33.1 per cent in farms of 100 to 174 acres; these two size groups comprising about five-sixths of the aggregate acreage. The native white farmers numbered 167,856 and the foreign-born white 48,987. The negro and other nonwhite farmers numbered only 187.

The acreage, value, and production of the principal crops in 1914, as estimated by the United States Department of Agriculture, are shown in the following table.

LEADING CROPS	Acreage	Prod. bu.	Value
Corn	10,248,000	389,424,000	$144,712,000
Wheat	810,000	15,066,000	14,463,000
Oats	5,000,000	165,000,000	67,650,000
Barley	360,000	9,360,000	5,148,000
Potatoes	147,000	12,642,000	7,459,000
Hay	2,950,000	*4,071,000	41,117,000

* Tons.

The total value of the crops in 1909 was $314,666,000, and the combined acreage of crops in that year was 20,374,925, representing 69.1 per cent of the total improved land in farms.

The general character of agriculture in Iowa is indicated by the fact that about three-fourths of the total value of crops in 1909 was contributed by the cereals and about one-fifth by hay and forage. The remainder, representing 7.9 per cent of the total, consisted mostly of vegetables, fruits and nuts, and forest products. Of the 15,041,039 acres reported for cereals in 1909, over three-fifths were in corn, which, together with the acreage of oats, formed over nine-tenths of the whole.

The total acreage of potatoes and other vegetables in 1909 was 252,243, and the value of the crops was $12,021,408. Excluding potatoes, sweet potatoes, and yams, the acreage of vegetables was 80,402, and the value of the crops was $5,266,000. In 1909, 3791 acres were devoted to the raising of plants and flowers and of nursery products, and the value was $1,503,305. The total quantity of orchard fruits produced in 1909 was 7,234,000 bushels, valued at $4,284,000. Of this quantity apples contributed more than nine-tenths and cherries, plums, and prunes most of the remainder. The production of grapes in 1909 amounted to 11,708,000 pounds, valued at $330,000. The production of orchard fruits in 1909 was twice as great as in 1899. The small fruits produced are of considerable value, and these amounted in 1909 to 10,344,052 quarts, valued at $966,894. Strawberries are by far the most important. A small amount of sugar beets is grown. The product in 1909 was 7,117 tons, valued at $35,024. There was grown also 28,957 tons of sorghum cane, from which were made 250,205 gallons of sirup, valued at $139,293.

Live Stock and Dairy Products. In 1910 the value of all live stock on the farms was $393,003,000. The number and value of live stock on Jan. 1, 1915, is estimated by the United States Department of Agriculture as follows: cattle, 2,683,000, valued at $100,612,000; horses, 1,600,000, valued at $168,000,000; mules, 58,000, valued at $6,438,000; swine, 8,720,000, valued at $95,920,000; sheep, 1,249,000, valued at $6,994,000. The fowls of all kinds in 1910 numbered 23,482,880, with a value of $12,269,881. The milk produced in 1909 was 318,954,506 gallons, from which were made 38,679,568 pounds of butter and 78,538 pounds of cheese. The value of the milk sold was $6,032,685, and the total value of milk, cream, butter, and cheese in 1909 was $40,268,583.

Forest Products. The State contains very little timber land. For a number of years saw mills have been largely dependent upon the forests of Minnesota and Wisconsin for logs, and the depletion of these, with the establishment of many mills in these States, has caused a decline in the lumber industry of Iowa. In 1909 the value of products was $12,659,000. There were produced on the farms in 1909 forest products valued at $3,649,032. These included firewood, fencing material, logs, railroad ties, telegraph and telephone poles, materials for barrels, tanbark, etc.

Manufactures. Though preëminently an agricultural State, Iowa's manufactures are of increasing importance. In 1909, exclusive of the value of the products of the neighborhood and hand industries, the value of manufactures was $259,238,000. The table on page 318 gives the most important figures relative to leading industries in 1909 compared with 1904. On account of the limitations of space only those in-

COMPARATIVE SUMMARY FOR 1909 AND 1904

THE STATE—ALL INDUSTRIES COMBINED AND SELECTED INDUSTRIES

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY		Capital	Wages	Cost of materials	Value of products	Value added by manufacture
			Total	Wage earners (average number)	Expressed in thousands				
All industries	1909	5,528	78,360	61,635	$171,219	$32,542	$170,707	$259,238	$88,531
	1904	4,785	61,361	49,481	111,427	22,997	102,844	160,572	57,728
Agricultural implements	1909	42	1,620	1,318	5,066	683	2,171	4,757	2,586
	1904	30	1,277	1,027	3,319	470	1,357	2,692	1,335
Artificial stone	1909	308	1,219	730	1,557	397	632	1,569	937
	1904	27	128	70	176	34	45	120	75
Boots and shoes, including cut stock and findings.	1909	10	770	716	790	318	1,059	1,633	574
	1904	5	499	478	419	186	522	854	332
Bread and other bakery products	1909	495	2,550	1,647	3,359	846	4,147	6,818	2,671
	1904	365	1,677	1,061	1,582	500	2,063	3,611	1,548
Brick and tile	1909	235	3,654	3,158	7,327	1,673	1,204	4,483	3,279
	1904	302	3,154	2,633	4,801	1,242	838	3,362	2,524
Butter, cheese, and condensed milk	1909	512	2,199	1,231	4,472	855	22,842	25,850	3,008
	1904	655	2,323	1,160	2,919	687	12,896	15,028	2,132
Buttons	1909	70	3,376	3,172	2,567	1,412	1,414	4,035	2,621
	1904	51	2,121	1,936	1,174	654	534	1,501	967
Canning and preserving	1909	71	1,420	1,247	3,503	299	1,568	2,549	981
	1904	59	1,769	1,607	2,920	418	2,118	3,675	1,557
Carriages and wagons and materials	1909	119	1,828	1,441	4,468	828	2,748	4,786	2,038
	1904	113	1,632	1,298	3,392	602	1,684	3,371	1,687
Cars and general shop construction and repairs by steam-railroad companies.	1909	33	7,460	6,969	5,488	4,535	5,149	10,269	5,120
	1904	40	6,781	6,372	3,628	3,860	3,303	7,619	4,316
Clothing, men's, including shirts	1909	28	1,672	1,480	1,554	425	1,412	2,496	1,084
	1904	18	1,375	1,176	1,325	335	1,142	1,920	778
Clothing, women's	1909	19	985	876	1,098	304	885	1,535	650
	1904	9	471	427	513	131	432	762	330
Confectionery	1909	40	1,302	1,032	1,272	360	1,703	2,914	1,211
	1904	24	819	688	752	187	794	1,435	641
Copper, tin, and sheet-iron products	1909	71	777	585	3,046	334	1,505	2,414	909
	1904	33	721	635	5,701	285	1,529	2,287	758
Flour-mill and gristmill products	1909	277	1,186	647	6,123	382	10,934	12,871	1,937
	1904	276	1,320	770	5,216	399	10,317	12,099	1,782
Foundry and machine-shop products	1909	274	6,289	5,108	12,865	3,085	6,372	14,064	7,692
	1904	211	3,913	3,221	6,456	1,669	2,653	6,331	3,678
Furniture and refrigerators	1909	44	1,257	1,074	2,232	606	1,336	2,650	1,314
	1904	35	1,034	858	1,343	370	803	1,677	874
Gas, illuminating and heating	1909	117	1,151	806	15,784	380	1,111	2,893	1,782
	1904	60	636	468	8,315	254	624	1,832	1,208
Leather goods	1909	67	845	600	2,038	353	1,812	2,855	1,043
	1904	35	533	413	953	196	768	1,310	542
Liquors, malt	1909	19	636	495	5,603	332	901	3,325	2,424
	1904	19	530	427	3,085	270	691	2,386	1,695
Lumber and timber products	1909	229	5,403	4,658	12,809	2,356	7,141	12,659	5,518
	1904	139	5,348	4,810	13,523	2,297	6,739	12,153	5,414
Marble and stone work	1909	87	504	315	926	243	616	1,338	722
	1904	36	340	241	487	152	263	636	373
Patent medicines and compounds and druggists' preparations.	1909	100	887	358	2,361	133	1,065	3,401	2,336
	1904	59	528	260	1,571	99	806	2,045	1,239
Printing and publishing	1909	1,110	8,065	4,853	10,623	2,591	3,287	12,129	8,842
	1904	1,113	6,665	4,317	7,329	2,038	2,048	8,549	6,501
Slaughtering and meat packing	1909	33	4,849	4,144	12,362	2,190	53,127	59,045	5,918
	1904	25	3,409	3,104	7,326	1,332	27,244	30,152	2,908
Tobacco manufactures	1909	372	2,523	1,943	1,821	856	1,386	3,423	2,037
	1904	444	2,734	2,072	1,599	847	1,280	3,359	2,079

dustries whose product had a value of 1,000,000 or over in 1909 are included in this table. Of the 61,635 wage earners, 51,770 were males and 9865 were females. The value, $88,531,000, added to products by manufacture represents the net wealth created by manufacturing operations during the year. There were, in 1909, 59 industries which had a value of products in excess of $500,000.

It will be noted from the table that the slaughtering and meat-packing industry is by far the most important when measured by value of products, although four other industries employed in 1909 a greater average number of wage earners. This industry is to a large extent confined to four cities: Cedar Rapids, Des Moines, Ottumwa, and Sioux City. The value of these products increased from $25,763,000 in 1899 to $59,045,000 in 1909. Industries connected with the making of butter, cheese, and condensed milk occupy second place when measured by value of products. Iowa has occupied a prominent place in the creamery industry ever since its establishment on a factory basis. From 1904 to 1908 the industry showed marked development, the value of products having increased 72 per cent. It ranked third in respect to its manufactured dairy products in 1909. Products of foundry and machine shops ranked third in value. This industry includes not only foundry and machine shops, but establishments engaged in the manufacture of gas machines and meters, hardware, plumbers' supplies, steam fittings and heating apparatus, and structural ironwork. Other important industries are those related to flour and grist mill products, lumber and timber products, printing and publishing, cars and general shop construction, and the manufacture of buttons. The lumber and timber industry includes logging operations as well as the mills. In 1909 the value of products was $12,659,000. The output of buttons in Iowa consists of the fresh-water pearl variety, made from the shells of the Mississippi River mussel. Muscatine is the centre of the industry, and it had within its corporated limits 43 of the 70 establishments in the entire State in 1909.

In 1909 the prevailing hours of labor for about three-fourths of the wage earners ranged from 54 to 60 a week. Sioux City had in 1909 the largest value of products of manufactures, $37,424,450, with 3750 wage earners. Cedar Rapids ranked second in value of products, $24,624,276, with 3565 wage earners; Des Moines had the largest number of wage earners, 5383, and ranked third in the value of products, $23,584,667. Other cities having a value of product of more than $10,000,000 in 1909 were Davenport, Dubuque, and Ottumwa. For additional details in regard to the manufactures of these and other cities of the State, see the articles under separate titles.

Transportation. The railway facilities, which consist of trunk lines and various branch lines serving as feeders, are excellent. In total length of track in 1909, Iowa ranked fourth among the States. Water transportation is afforded by the Mississippi River on the east boundary and the Missouri River on the west. Des Moines is the centre of a large number of railroad lines, and in general every section is amply provided with facilities. In the western part most of the railroads follow the course of some river, so that all of the larger tributaries to the Missouri River are paralleled by a railroad, thus giving them a northeast and southwest direction. The total railway mileage on July 30, 1914, was 9998. Railways having the largest mileage are the Chicago, Burlington, and Quincy (1365), Chicago Great Western (772), Chicago, Milwaukee, and St. Paul (1863), Chicago and Northwestern (1597), Chicago, Rock Island, and Pacific (2203), and the Iowa Central (798). The interurban lines in 1913 had a mileage of 413. The railroad rates are in the hands of the State Railway Commission. The interurban electric railways have been constructed mostly since 1906.

Banks. There were in Iowa on June 4, 1913, 340 national banks, with a total capital of $23,085,000 and total deposits of $234,583,000; 378 State banks with deposits subject to check amounting to $37,065,756 and savings deposits amounting to $24,180,259; 759 stock savings banks, with 354,742 depositors, deposits subject to check amounting to $45,177,018, and savings deposits amounting to $118,984,907; 16 loan and trust companies, with deposits subject to check amounting to $100,404 and savings deposits amounting to $1,134,622; and 84 private savings banks, with deposits subject to check amounting to $1,787,012 and savings deposits amounting to $189,276.

Government. Iowa has been governed under two constitutions. The first was adopted by the people in 1846, and the second, now in force, but amended in several important details, was sanctioned by the people at an election held in 1857. Amendments to the constitution may be proposed in either House of the General Assembly; if agreed to by a majority of the members of each House of two consecutive legislatures, such amendments are submitted to the people. In each tenth year dating from 1870, and also at such times as the General Assembly may provide, the question "Shall there be a convention to revise the constitution and amend the same?" shall be decided by the electors qualified to vote for members of the General Assembly; and in case a majority of the electors shall decide in favor of a convention, the General Assembly at its next session shall provide by law for the election of delegates to such convention.

Legislative.—The legislative authority is vested in a General Assembly, which consists of a Senate and a House of Representatives. The sessions of the General Assembly are biennial, beginning on the second Monday in January next following the election of its members, unless the Governor shall, in the meantime, convene it by a proclamation. Senators are chosen for a term of four years and Representatives for two years. The number of Senators shall be not less than one-third nor more than one-half the representative body. The Senate is composed of 50 members, and the House of Representatives consists of not more than 108 members. Members of the House of Representatives must be at least 21 years of age, and Senators must be at least 25 years of age.

Executive.—The supreme executive power is vested in the Governor, whose term of office is two years. He receives an annual salary of $5000, an allowance of $600 for house rent, and $1200 for services as member of the Executive Council. The Governor must be at least 30 years of age. There is also a Lieutenant-Governor, who holds office for two years and is elected at the same time as the Governor. The other executive officers are Secretary of State, Auditor of State, and Treasurer of State. These continue in office for two years, or until their successors are elected and qualified.

Judiciary.—The supreme court consists of seven judges, four of whom constitute a quorum for the transaction of business. The State is divided into 21 judicial districts, and each district is entitled to from one to five judges. In 1914 there were 59 judges of the district court, elected for a term of four years. A superior court may be established in cities containing 4000 inhabitants. In 1914 there were seven such courts, in the cities of Council Bluffs, Cedar Rapids, Grinnell, Keokuk, Oelwein, Perry, and Shenandoah, elected for terms of four years. An attorney-general is elected for two years, and each county has a county attorney, elected also for two years.

Suffrage and Elections.—Every male citizen of the United States of the age of 21 years, who shall have been a resident of Iowa for six months next preceding the election, and of the county in which he claims his vote 60 days, is entitled to vote at all elections. The general election for State, district, county, and township officers is held on the Tuesday following the first Monday in November. There are statutory provisions for direct primaries and for the direct election of United States Senators. The Legislature of 1913 passed a measure providing for the nonpartisan nomination and election of all judges of courts of record. This includes judges of the supreme court, district court, and superior courts. This Legislature also adopted the amendment to the Federal Constitution providing for the direct election of United States Senators by the people. The Legislature of 1913 also passed a joint resolution providing for the initiative and referendum. This calls for an amendment to the State constitution.

Local and Municipal Government.—The unit of local government is the county. Counties must contain not less than 432 square miles. No county or other political or municipal corporation is allowed to become indebted in any manner or for any purpose to an amount in the aggregate exceeding 5 per cent on the value of taxable property within such county or corporation. The electors of each county elect every two years such officers as are necessary for its government. The cities may establish on the approval of 60 per cent of the voters a department of publicity, development, and general welfare. The Legislature of Iowa was one of the first to authorize the commission form of government for cities, and the system of city government adopted by Des Moines in June, 1907, came to be known as the Des Moines System. It aroused great interest among students of municipal government. (See MUNICIPAL GOVERNMENT.) Other cities which have adopted the commission form of government include Burlington, Cedar Rapids, Fort Dodge, Keokuk, Marshalltown, Mason City, Ottumwa, and Sioux City.

Other Constitutional and Statutory Provisions.—The property rights of husbands and wives are equal, each upon the death of the other inheriting one-third in value of his or her real estate, while neither is liable for the separate debts of the other. Women are eligible to all offices connected with public schools. There is a pure-food law, conforming in its essential provisions to the national law. The use of narcotics by minors is prohibited, as is the sale of cocaine and certain other drugs. County attorneys in certain cases, with the approval of the court or a judge, are allowed to prosecute criminal cases to final judgment on information without the intervention of the grand jury. The Legislature of 1911 created the office of commerce counsel. It is the duty of this officer to investigate the reasonableness of rates charged for service rendered by railroads, express companies, parties, or corporations subject to the jurisdiction of the board of railroad commissioners. In general, he represents the people in matters pertaining to commerce. There is a workmen's compensation law and laws providing for safety in coal mines. The office of dairy and food commissioner was created in 1911. Thus Iowa is nominally under prohibition as the result of prohibitory laws passed in 1884 and in later years. However, the so-called Mulct Law rendered the prohibitory provisions inoperative by permitting the sale of liquor in counties where petitions, requesting licenses, show the valid signatures of 65 per cent of the voters who voted at the last general election, and in cities of 5000 population or more where a special petition shows the valid signatures of a majority of such voters. In cities of 2500 population and under 5000, the law requires a petition with the signatures of 88 per cent of the voters in order to make liquor selling legal. There are laws preventing the sale of liquor on trains, and also a law prohibiting others than qualified electors engaging in the sale of intoxicating liquors. In 1913, 10 cities with a population of 5000 or more were under no-license. The largest of these were Waterloo, Ottumwa, Muscatine, and Mason City. On Jan. 1, 1914, there were 519 saloons in Iowa.

Finance. The report of the State Treasurer for the biennial period 1912–14 shows a balance on hand June 30, 1914, of $737,860. The total debt on July 1, 1914, was $142,313. This was entirely a floating debt. The State has no bonded debt. The chief sources of revenue are the general property tax, tax of insurance companies, the collateral inheritance tax and fees from corporations, tax on motor vehicles, etc. The chief expenditures are for education and for the support of State institutions and State officers.

Militia. The number of males available for military duty in 1910 was 306,669. The organized militia consists of one brigade of infantry and a sanitary troop, which includes a field hospital. The infantry brigade consists of four regiments of 12 companies each. The total number of enlisted men in 1913 was 2768, and the officers numbered 213.

Population. The population of Iowa by decades is as follows: 1840, 43,112; 1850, 19,214; 1860, 674,913; 1870, 1,194,020; 1880, 1,624,615; 1890, 1,912,297; 1900, 2,231,853; 1910, 2,224,771. The estimated population on July 1, 1914, was 2,221,755. In 1910 it ranked fifteenth in population among the States, and is the only State in the Union which showed a decrease in the population in the decade 1900–1910. This decrease of 0.3 per cent, while it affected most counties, was confined entirely to the rural population. The urban population (places of 2500 or more) increased from 567,267 in 1900 to 680,054 in 1910. The rural population decreased from 1,664,586 in 1900 to 1,544,717 in 1910; the decrease is attributed partly to the natural tendency which is evident in nearly all the States for the population to centre in cities, and partly to the fact that, as the improved agricultural land has practically all been taken, many farmers moved to other States and to Canada, where new land could be obtained. The population per square mile in 1910 was 40. The native white population in 1910 numbered 1,935,707, the foreign-born white 273,484, and the negro 14,973. The population was divided by sex in 1910 into 1,148,171 males and 1,076,600 females. Males of voting age numbered 663,672.

There is no large centre of population, and the percentage of urban population is small compared with most of the North Central States. There were in 1910 eight cities with a population of 25,000 or over. These, with their populations in 1910, are as follows: Des Moines, 86,368; Sioux City, 47,828; Davenport, 43,028; Dubuque, 38,494; Cedar Rapids, 32,811; Council Bluffs, 29,292; Waterloo, 26,693; Clinton, 25,577.

Education. Educational standards in Iowa are exceptionally high. This is shown by the fact that the percentage (1.7) of illiteracy in 1910 was lower than any other State. Of a population of 1,760,286 of 10 years of age or over, the illiterates numbered 29,889. The total school population (ages 6 to 21 years), according to the thirteenth census, was 675,222. The total enrollment in the public schools in 1913 was 507,845. There were employed in that year 27,432 teachers, of whom 2544 were men and 24,888 women. The average monthly compensation of men teachers was $83.22 and of women teachers $49.91. The total expenditures for schools in 1913 was $16,442,528. The total number of schoolhouses was 13,858.

Iowa has had administrative problems of unusual difficulty in the conduct of its schools. These include a too great multiplication of school districts, together with a decreasing rural population and the lack of gradation common in the country schools. These problems, however, have been studied carefully, and the difficulties have to a large extent been eliminated. Recent legislatures have passed a number of excellent measures which have contributed largely to the efficiency of the system. Each school district exists as a school corporation, and the consolidation of two or more districts as consolidated independent school districts is provided for. There were, in 1914, 802 high schools with an attendance of 48,770. In addition to these there were many private, normal, secondary, and parochial schools. The Legislature of 1913 enacted a large number of important measures affecting education. Among these was an act to establish a minimum wage for teachers in the public schools. The Department of Public Instruction was reëstablished. The Superintendent of Public Instruction, appointed by the Governor for a term of four years, has supervision over all schools under the control of the State. The Legislature provided for normal training in high schools with State aid, and provision was made also for State aid to consolidated schools. Another measure provided for the teaching of elementary agriculture, domestic science, and manual training in the public schools after July 1, 1915. The compulsory attendance law was amended so that any person having control of any child at the age of 7 to 16 years inclusive is compelled, with exceptions, to cause such child to attend some public, private, or parochial school for at least 24 consecutive school weeks in each school year. Provision was made by this Legislature for the use of school buildings for public recreation grounds. Provision was also made for the education of deaf and dumb persons.

There are two private normal schools: the Normal and Scientific Institute at Bloomfield and the Western Normal College at Shenandoah. The institutions for higher education include Iowa State University at Iowa City, the Iowa State College of Agriculture and Mechanic Arts at Ames, Iowa State Teachers College at Cedar Falls, Coe College at Cedar Rapids, Charles City College at Charles City, Des Moines College at Des Moines, Drake University at Des Moines, St. Joseph's College at Dubuque, St. Ambrose College at Davenport, Parsons College at Fairfield, Upper Iowa University at Fayette, Grinnell College at Grinnell, Lenox College at Hopkinton, Simpson College at Indianola, Ellsworth College at Iowa Falls, Iowa Wesleyan College at Mount Pleasant, Cornell College at Mount Vernon, Penn College at Oskaloosa, Central University of Iowa at Pella, Morningside College at Sioux City, Buena Vista College at Storm Lake, Tabor College at Tabor, Leander Clark College at Toledo, Highland Park College at Des Moines, and Luther College at Decorah. All these, with the exception of St. Ambrose and St. Joseph's College, are coeducational.

Charities and Corrections. The charitable and correctional institutions include the Reformatory at Anamosa, the Cherokee State Hospital at Cherokee, the Clarinda State Hospital at Clarinda, the School for the Deaf at Council Bluffs, the Soldiers' Orphans Home at Davenport, the Industrial School for Boys at Eldora, the State Penitentiary at Fort Madison, the Institution for Feeble-Minded Children at Glenwood, Independence State Hospital at Independence, State Hospital for Inebriates at Knoxville, Soldiers' Home at Marshalltown, Industrial School for Girls at Mitchellville, Mount Pleasant State Hospital at Mount Pleasant, and State Sanatorium at Oakdale. These institutions are all under the supervision of the Board of Control of State Institutions. In addition there are a number of county and private institutions which are also subject to inspection and regulation by this board. The Legislature of 1911 passed a measure suspending the execution of sentence for the first offender except for murder, treason, robbery, or arson. In the same year surgeons in State institutions were authorized to sterilize criminals, idiots, feeble-minded, drug fiends, and epileptics. A commission appointed to investigate conditions in penal and correctional institutions reported in May, 1912, recommending many changes in penal administration, notably the abolition of the contract system and the purchase, for the use of first offenders and good-conduct and short-term convicts, of a farm of 2000 acres near Des Moines.

Religion. While the Roman Catholics have the largest number of members of all churches, the membership of the Methodist church, together with its adherents, is much stronger and is almost twice as great as that of any other Protestant denomination. Among a large number of other churches represented, the largest in their order are: Lutherans, Presbyterians, Baptists, Disciples of Christ, and Congregationalists.

History. The aboriginal inhabitants of the State were the Indian tribes of Iowa (q.v.) and Illinois (q.v.), who in the course of time were driven from their homes by the Sacs and Foxes. Marquette and Joliet in 1673 and Hennepin in 1680 touched what are now the borders of the State. In 1788 Julien Dubuque, a Frenchman from Canada, obtained from the Indians the grant of a large tract of land, including the site of the city now bearing his name, and the rich mineral country surrounding it. He built a fort there, carried on the mining of lead, and traded with the Indians, but on his death in 1810 the settlement was abandoned. In 1803 the region passed to the United States as a part of the Louisiana cession, and Indian titles to the land were extinguished by treaties in the years 1804, 1832, and subsequently. It formed, in turn, a part of the Territories of Louisiana (organized in 1804), Missouri, Michigan, and Wisconsin. On June 12, 1838, it was organized as the Iowa Territory. In 1832 a number of emigrants settled on the site of Fort Madison, which had been erected by the United States government in 1808 and abandoned five years later. About the same time a settlement was made in the neighborhood of Burlington, and in 1833 Dubuque was founded. Six years later the government was removed to Iowa City, and in 1844 a State constitution was framed and admission to the Union sought for. After some delay, caused by the action of Congress in restricting greatly the boundaries of the new State, and after the rejection of two constitutions, the State was admitted on Dec. 28, 1846. Immigration was rapid and continued in spite of a bloody massacre of whites by Sioux Indians at Spirit Lake in March, 1857. In the same year the original constitution of 1846 was revised and Des Moines was made the capital. In the Civil War, Iowa, whose fundamental law prohibited slavery, took a zealous part. The two most important questions of public moment since 1870 have been railway legislation and prohibition. The development of the State was greatly accelerated by the building of railroads, of which there were, in 1900, nearly 10,000 miles; but with the rise of powerful railway corporations there ensued a continuous conflict between the Legislature and the companies in regard to the taxation of railway property and the regulation of rates. In 1872 an Act taxing railway property was passed, and in 1873 a powerful agitation stirred up by the Patrons of Husbandry (see GRANGE) against the extortionate rates imposed by the companies led to the creation of a board of railroad commissioners for the purpose of determining a maximum rate and preventing discrimination. Radical action on the part of the commissioners caused repeated appeals to the courts, and though many concessions were wrung from the companies, the advantage in general remained with them. A Prohibition amendment adopted in 1882 was promptly declared unconstitutional by the courts. A new law went into effect in 1884 and for some years proved fairly adequate. A very large part of the population, however, was opposed to sumptuary legislation, and in 1890, under the protection of the interstate commerce laws, a successful attempt was made to evade the antiliquor regulations by the importation of alcoholic products from other States. In 1894 the courts declared the prohibitory laws unconstitutional. From 1846 to 1854 the State was Democratic both in national and State politics. From 1854 to 1912 its vote in national elections was cast for the Republican candidate. The State government, as a whole, has always been in the hands of the Republicans, and only in 1889 and 1891, years of stormy railway and liquor legislation, was a Democratic Governor elected. In the first decade of the twentieth century Iowa, under the leadership of Albert B. Cummins and others, became one of the more radical of the States in the adoption of new political policies. The "Iowa Idea" became the synonym for advanced steps in government. In 1908 Senator Allison, who early in the year had received the nomination to succeed himself to the United States Senate, died on August 4. At a special session held by the Legislature, Governor Cummins failed to be elected to the vacancy. However, at the senatorial primary held during the general election, he was nominated by a large majority and subsequently elected. In the election on November 3 the vote for President and Governor was as follows:

PRESIDENT		GOVERNOR	
Taft, Rep.	275,210	Carroll, Rep.	256,980
Bryan, Dem.	200,771	White, Dem.	194,129

The campaign and elections of 1910 were of especial interest, since the Progressives were stronger in Iowa than in any other State except Kansas. Governor Carroll received the Republican nomination for reëlection by a small margin, and after a spirited campaign was elected. Two Democratic congressmen were elected. Senator Dolliver died on October 15 of that year, and after a 12-week deadlock the Legislature, in 1911, elected William S. Kenyon to complete the term expiring on March 4, 1913. On June 3, 1912, Senator Kenyon received the nomination for reëlection over Lafayette Young, his principal opponent. He was reëlected by the Legislature on Jan. 21, 1913. A Republican Legislature was elected, insuring the election of a Republican Senator. In November, 1914, Senator Cummins was reëlected. The Progressive vote showed a great decline. The State has 11 members in the national House of Representatives. The vote for President and Governor in 1912 was as follows:

PRESIDENT		GOVERNOR	
Wilson, Dem.	185,276	Clarke, Rep.	184,148
Roosevelt, Prog.	161,783	Dunn, Dem.	182,449
Taft, Rep.	119,811	Stevens, Prog.	71,877

The Governors of Iowa since its organization as a Territory have been as follows:

TERRITORIAL

Robert Lucas	1838–41
John Chambers	1841–46
James Clark	1846

STATE

Ansel Briggs	Democrat	1846–50
Stephen Hempstead	"	1850–54
James Wilson Grimes,	Whig and Free-Soil Democrat	1854–58
Ralph P. Lowe	Republican	1858–60
Samuel J. Kirkwood	"	1860–64
William M. Stone	"	1864–68
Samuel Merrill	"	1868–72
Cyrus C. Carpenter	"	1872–76
Samuel J. Kirkwood	"	1876–77
Joshua G. Newbold	"	1877–78
John H. Gear	"	1878–82
Buren R. Sherman	"	1882–86
William Larrabee	"	1886–90
Horace Boies	Democrat	1890–94
Frank Darr Jackson	Republican	1894–96
Francis Marion Drake	"	1896–98
Leslie Mortimer Shaw	"	1898–1902
Albert B. Cummins	"	1902–08
B. F. Carroll	"	1908–12
George W. Clarke	"	1912–

Bibliography. Monette, *History and Discovery of the Mississippi Valley* (New York, 1846); Hyatt, *Manufacturing, Agricultural, and Industrial Resources of Iowa* (Des Moines, 1873); *Iowa Geological Survey Publications* (ib., 1893 et seq.); *State Historical Society Annals* (Iowa City); B. F. Shambaugh, *Documentary Material relating to History of Iowa* (3 vols., 1895–1901); H. M. Bowman, *Administration of Iowa* (New York, 1903); B. F. Gue, *History of Iowa* (4 vols., ib., 1904); Macy and Geiser, *Government of Iowa* (Boston, 1905); John Todd, *Early Settlement and Growth of Western Iowa* (Des Moines, 1906); D. G. McCarty, *Territorial Governors of Old Northwest* (Iowa City, 1910); McFee, *Story of Iowa* (Des Moines, 1912); Meyerholz, *History and Government of Iowa* (Chicago, 1912); Chandler, *Iowa and the Nation* (ib., 1913). Consult also reports of the State departments and statutes.

IOWA. The name of a tribe of American Indians, belonging to one of the main divisions of the great Siouan linguistic family. At the beginning of the eighteenth century they dwelt in Minnesota and afterward farther south in the area which now bears their name. They were called Pahotcha or Pahucha (dusty noses) in their own tongue, Ayanway by Lewis and Clark, and Ajowes by French traders. In 1836 they were moved to the west bank of the Missouri above Wolf River, and in 1861 they ceded part of their lands to the United States, settling upon reservations in Kansas and Oklahoma. In culture they were similar to the Omaha, being an agricultural buffalo-hunting people. At present they number but 224. There is no good published account of this tribe, but for a brief sketch consult W. H. Miner, *Iowa Indians: A Sketch of their History* (Cedar Rapids, Iowa, 1912).

IOWA, State University of. A State institution for higher education, founded at Iowa City, Iowa, by Act of the Legislature passed in 1847. The capitol, together with the land upon which it stood, was given to the university in view of the contemplated removal of the seat of government from Iowa City. The delay in removing the capital prevented the opening of the institution until March, 1855. The organization of departments began in the same year. From 1858 until 1860, owing to the lack of funds, the normal department was the only one in operation, and the university was reorganized in 1860. The law department was established in 1868, the medical department in 1876, the dental department in 1882, the department of pharmacy in 1885, the Graduate College in 1900, the College of Applied Science in 1905, the College of Fine Arts, or Mark Ranney Memorial Institute of Fine Arts, in 1911, and the College of Education in 1913. In 1909, pursuant to an act of the General Assembly, the control of the university, together with that of the Iowa State Teachers College and the Iowa State College of Agriculture and Mechanic Arts, passed into the hands of the State Board of Education. The university is an integral part of the public-school system of the State. Its work is based upon the preparation afforded by the duly accredited high schools, whose students are admitted to the undergraduate and professional courses upon the presentation of the proper certificates—except in the colleges of medicine and law, which require two years of collegiate work in preparation. The State, through the university, undertakes to furnish instruction in the various branches requisite for an education in the liberal arts, law, medicine, dentistry, pharmacy, fine arts, nursing, and engineering. It also aims to encourage research work in all departments. The income of the university is derived from the university funds and lands originally given by the United States and appropriations made by the State Legislature. The campus includes some 50 acres in the centre of Iowa City. On this are about 30 buildings, which are grouped around the historic old capitol grounds. The Iowa River has been dammed just below the university grounds, providing a water front for the enlarged campus and good facilities for aquatic sports. The majority of the buildings are new. The university is coeducational. In the collegiate year 1913–14 the total enrollment in all departments was 2669, and of these 679 were men and 990 women. In the College of Liberal Arts were 1392, in the College of Law 203, in the College of Medicine 109, in the College of Homœopathic Medicine 5, in the College of Dentistry 246, in the College of Pharmacy 62, in the Graduate College 328. The faculty numbers about 275. The university library contains about 100,000 volumes and the university law library about 15,000 volumes. The publications of the university include a natural history bulletin, a law bulletin, university studies in psychology, and studies in sociology, economics, politics, languages, and history. The control of the university is vested in the State Board of Education, and the finances are administered by a finance committee, consisting of three members appointed by the board. The acting president in 1914 was T. H. Macbride, Ph.D.

IOWA CITY. A city and the county seat of Johnson Co., Iowa, on the Iowa River, 54 miles west by north of Davenport, on the Chicago, Rock Island, and Pacific and the Cedar Rapids and Iowa City railroads (Map: Iowa, F 3). The State University occupies the grounds and buildings of the former capitol, and also seven fine buildings erected by the Commonwealth. In Iowa City are the State Historical Society Library, Ranney Memorial Library, Iowa City Academy, Mercy Hospital, and the medical department and homœopathic hospitals connected with the university; and among other prominent structures are the county courthouse, a Carnegie library, Masonic Temple, post office, State tuberculosis sanitarium, and opera house. The industrial establishments comprise meat-packing plants, agricultural-implement works, a large jewelry factory, flour mills, knitting mills, glove and mitten factories, broom factories, soap and perfume factories, brick and tile works, a foundry, machine shops, etc. The government is administered by a mayor, elected every two years, and a unicameral council. Pop., 1900, 7987; 1910, 10,091; 1914 (U. S. est.), 10,412. Founded in 1839 and incorporated in 1853, Iowa City was from 1839 to 1857 the capital of Iowa Territory and State. It was connected with the East in 1855 by the completion of the Mississippi and Missouri Railroad. Consult "The Historic Capital of Iowa," in *Magazine of American History*, vol. xxi (New York, 1888), and B. F. Shambaugh, *Iowa City: A Contribution to the Early History of Iowa* (Iowa City, 1893).

IOWA COLLEGE, The Trustees of. The legal name of the institution commonly known as Grinnell College (q.v.). The name gave much trouble because of the confusion with the State University and the State College, and in 1909 the trustees authorized the name Grinnell College for use in all ordinary cases. This is the name used on all publications of the college.

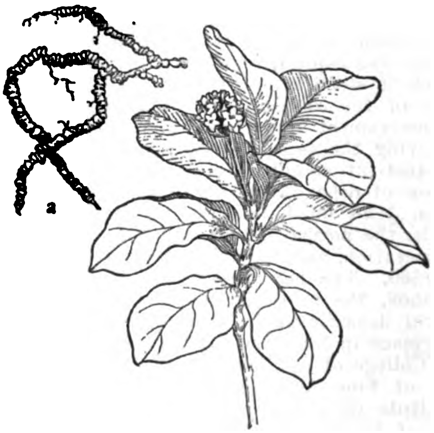
IOWA FALLS. A city in Hardin Co., Iowa, on the Iowa River, 50 miles east of Fort Dodge, on the Chicago and Northwestern, the Illinois Central, and the Chicago, Rock Island, and Pacific railroads (Map: Iowa, D 2). It is the seat of Ellsworth College and contains a Carnegie library. A large shipping trade in grain, produce, and stone is carried on; and there are gasoline-engine works, tile and ditcher factories, etc. Iowa Falls adopted the city-manager plan of government in 1914. Pop., 1900, 2840; 1910, 2797.

IOWA RIVER. A river in the State of Iowa, rising in Hancock County, near the Minnesota line, and flowing southeast into the Mississippi, about 30 miles north of Burlington (Map: Iowa, F 3). It is 300 miles long and navigable to Iowa City, about 66 miles from its mouth. The river's drainage area is about 12,400 square miles, not including the basin of its chief tributary, the Cedar River (7600 square miles).

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS. A coeducational State institution at Ames, Iowa, established by Act of Legislature in 1858. In 1862 the college came into possession of a grant of public lands bestowed by general act of Congress for the purpose of fostering agricultural and mechanic education. It was formally opened in 1869. It is a college of advanced technology, organized in divisions of agriculture, engineering, home economics, industrial science, and veterinary medicine. The department of agriculture is designed to give a general training for the career of a farmer and, in its longer course, to develop specialists in particular lines of work. A well-stocked farm provides practical work in all the agricultural processes, and the Iowa Experiment Station, in intimate relation to the college work of instruction, gives opportunity for original investigations of agricultural problems. In addition to courses in mechanical, civil, electrical, and mining engineering, the college gives instruction in clay working and ceramics and has a department of technology intended to equip students for the manufacturing industries. The division of industrial science supplies foundations in science, language and literature, and economic science. In the instruction of women emphasis is laid on the course in home economics. All male students are required to become members of the college battalion. The college domain includes about 1175 acres, of which about 120 acres form the campus. The buildings number 17 besides dwelling houses and buildings for farm stock, machinery, and work, all valued at $2,000,000. The endowment in 1914 was $683,709, the income $349,407, and the value of all the college property $3,000,000. The library contained 45,000 volumes. Tuition is free to residents of Iowa, students from other States paying an annual fee of $50. Students are admitted on examination or on certificates from accredited schools. The college has of late developed rapidly and in 1914 had an attendance of 3458 students and a faculty of 217 members. The president in 1914 was Raymond A. Pearson.

IOWA WESLEYAN COLLEGE. A coeducational institution for higher learning founded at Mount Pleasant, Iowa, in 1842, under the control of the Methodist Episcopal church. In 1914 it had an attendance of 298, including 195 collegiate and 55 preparatory students. The faculty numbered 27. The endowment of the college is about $300,000, and the annual income about $40,000. The grounds and buildings are valued at about $225,000. The library contains about 11,000 volumes, exclusive of government documents. The president in 1914 was Edwin A. Schell, Ph.D.

IPECACUANHA, ĭp′ê-kăk′ū-ăn′ȧ (Portug., from Brazilian *ipecaaguen*, small wayside plant emetic, the native name). The name both of a very valuable medicine and of the plant producing it. According to the American and English pharmacopœias the source of this drug is *Cephaelis ipecacuanha* (referred by some botanists to *Psychotria ipecacuanha* and *Uragoga ipecacuanha*), which belongs to the family Rubiaceæ and grows in damp, shady woods in Brazil and some other parts of South America. It is somewhat shrubby, with a few oblong-lanceolate leaves near the ends of the branches, long-stalked heads of small white flowers, and soft, dark purple berries. The part of ipecacuanha used in medicine is the root, which is simple or divided into a few branches, flexuous, about as thick as a goose quill, and is composed of rings of various size, somewhat fleshy when fresh, and appearing as if closely strung on a central woody cord. The different kinds known in commerce (gray, red, brown) are all produced by the same plant, the differences arising from the age of the plant, the mode of drying, etc. Ipecacuanha root is prepared for the market by mere drying. It is collected at all seasons, although chiefly from January to March. The plant is seldom cultivated in South America, but is sought for in the forests chiefly by Indians. It has been successfully cultivated in India and elsewhere, but the slow growth and low price have kept it from being profitable. Various other plants are used as substitutes for it. The ipecacuanha of Venezuela is produced by *Sarcostemma glaucum*, of the family Asclepiadaceæ; and to this family belongs *Tylophora asthmatica*, the root of which is found a valuable substitute for ipecacuanha in India. Other un-



IPECACUANHA.
a, root.

officinal plants which are said to resemble ipecac in their effect are *Richardsonia pilosa*, *Richardsonia rosea*, *Psychotria emetica*, and various species of *Ionidium*. *Gillenia stipulata* is called American ipecac.

It is in the bark of the root that the active principle, the emetine, almost wholly lies, the other ingredients, such as fatty matters, starch, pectine, saccharose, choline, lignine, etc., being almost entirely inert. Emetine is represented by the formula $C_{28}H_{40}N_2O_5$ according to Lefort and Wurtz, and by $C_{30}H_{44}N_2O_4$ according to Glenard. It is a white, inodorous, almost insipid powder, moderately soluble in alcohol, and having all the characters of the vegetable alkaloids. It acts as a violent emetic in doses of one-sixteenth of a grain or even less, and is a powerful poison. In small and repeated doses ipecacuanha increases the activity of the secreting organs, especially of the bronchial mucous membrane, and of the skin. In larger doses it excites nausea and depression, while in still larger doses it acts as an emetic, without producing such violent action, or so much nausea or depression, as tartar emetic. Ipecacuanha is useful as an emetic when it is necessary to unload the stomach in cases where there is great debility or in childhood. As a nauseant, expectorant, and diaphoretic, it is prescribed in bronchitis, etc., and in disorders in which it is desired to increase the action of the skin. Besides the powder, the most useful preparations are the wine of ipecacuanha and Dover's powder, in which ipecacuanha is a constituent. To produce the full effect as a sudorific, a dose of Dover's powder should be followed by copious drafts of some warm and harmless drink.

IPEK, ē-päk′ (i.e., silk), Serb **PEČ,** pěch. A pleasant town of Montenegro, on the Bistrica (Bitritsa), or White Drin, close to the Servian frontier (Map: Balkan Peninsula, C 3). The houses are large and handsome, and as a rule have gardens in which fruit and mulberry trees are cultivated. Silk is extensively spun, and arms are manufactured. Ipek has a celebrated monastery, the former residence of the Servian patriarchs. Pop., about 10,500, mostly Serbs and Albanians. Ipek belonged for centuries to the Ottoman Empire, constituting an important town in the Sanjak of Novibazar, but in accordance with the territorial settlements of 1913, which followed the Balkan War (q.v.), it came into the possession of Montenegro.

IPHIC′RATES (Lat., from Gk. Ἰφικράτης, *Iphikratēs*). An Athenian general of the first half of the fourth century B.C. He was of humble parentage. At an early age he began his military career in the so-called Corinthian War. He was in command of the Athenian troops at Lechæum, near Corinth, in 393 B.C., where the Spartans were victorious over the allies. Immediately afterward he proceeded to introduce important changes in the armor and discipline of his troops. Thus, he made their swords and javelins longer, and, by substituting linen corselets for coats of mail, and light leggings or greaves for heavier greaves of metal, he made them capable of much greater rapidity of movement. With a band of the light-armed troops, called *peltasts*, he unexpectedly fell upon and destroyed or put to rout a Lacedæmonian *mora* of hoplites, or heavy-armed infantry, 600 strong, near Corinth. In 389 B.C. he was sent to Thrace to combat the Spartans under Anaxibius, and by a well-planned attack he inflicted a crushing defeat upon the Lacedæmonians. After the Peace of Antalcidas (387 B.C.) Iphicrates remained in Thrace, employing his peltasts in the service first of King Seuthes and then of King Cotys. In 378 B.C. he was sent, at the request of Pharnabazus, to assist Artaxerxes II in reconquering Egypt, but the undertaking was a failure. In 373 B.C. he was appointed joint admiral with two others to go to the relief of Corcyra, then besieged by the Spartans; in this command he was successful. In 369 B.C. he was sent to the neighborhood of Corinth to assist the Spartans against the Thebans, and later in the same year he commanded a small squadron on the coast of Macedonia. He remained in this neighborhood three years and was instrumental in retaining the family of Amyntas on the throne of Macedonia. He later held a command in the Social War (see GREECE, *Ancient History*), but was arraigned, on a charge preferred by Chares, his colleague, for neglect of duty and traitorous conduct in the battle at the Hellespont. He was acquitted, though his colleague Timotheus, who was arraigned at the same time and on the same charge, was fined 100 talents. Iphicrates died in Thrace (or, as some say, in Athens) in 353 B.C. Consult the Latin Life of Iphicrates by Cornelius Nepos, and, for his changes in the equipment of his troops, etc., Bauer, *Die griechischen Privat- und Kriegsaltertümer* (2d ed., Munich, 1893).

IPH′IGENI′A (Lat., from Gk. Ἰφιγένεια, *Iphigeneia*), or **IPH′IANAS′SA** (Lat., from Gk. Ἰφιάνασσα: see Leaf on *Iliad*, ix, 145, and Merrill on Lucretius, i, 85). According to the usual Grecian legend, a daughter of Agamemnon and Clytemnestra. Her father having offended Artemis, the Greek fleet, when on its way to Troy, was detained at Aulis by calms and a plague. Calchas, the seer, declared that only the sacrifice of Iphigenia could appease the goddess. At the altar the goddess took pity on the victim, substituted a hind, and carried Iphigenia in a cloud to Tauris (see CHERSONESUS, 2), where she became priestess of the Tauric Artemis, to whom strangers were offered in sacrifice. Thither came her brother Orestes (q.v.), and he was on the point of being sacrificed when he was recognized by his sister. Together they fled with the sacred wooden image of Artemis to Sparta, Argos, or, according to the Attic version, to Brauron in Attica, where Iphigenia remained as priestess of Artemis Brauronia, or Artemis Tauropolos, and where her grave was shown. (See BRAURONIA.) Hesiod declared that Iphigenia did not die, but was by Artemis made the goddess Hecate. The Spartans declared that the image of the Tauric Artemis was brought to Laconia, and that there the goddess was worshiped as Artemis Orthia. The legend is unknown to the Homeric poems, but was told in the *Cypria* (q.v.) and later became very popular, especially through the influence of the Athenian dramatists. The story is also represented on late vases, sarcophagi, and Pompeian wall paintings. Iphigenia is originally a goddess akin to Artemis and worshiped in early times with bloody rites, or else her whole story was developed out of an epithet of Artemis. Consult: M. C. H. E. Jacobson, *De Fabulis ad Iphigeniam Pertinentibus* (Königsberg, 1888); R. Förster, *Iphigenie* (1898); C. M. Gayley, *The Classic Myths in English Literature and Art* (2d ed., Boston, 1911);

F. A. Hall, *Iphigenia in Literature* (St. Louis, 1911). The story figures largely in plays, Greek and Latin, and in modern literatures. See Iphigenia among the Tauri; Iphigenia at Aulis; Iphigénie; Iphigenie auf Tauris; Iphigénie en Aulide; Iphigénie en Tauride; Iphigenie in Delphi.

IPHIGENIA AMONG THE TAU′RI (Gk. Ἰφιγένεια ἡ ἐν Ταύροις, *Iphigeneia hē en Taurois*). A play of Euripides, produced about 412 B.C., continuing the story of Iphigenia after her rescue from the sacrifice, and her transportation to Tauris, where she is made the priestess of Artemis. Orestes, pursued by Furies, comes with his friend Pylades to Tauris, and is to be sacrificed to the goddess, when he is made known to his sister in a touching scene, and carries her back to their land. The play is original and careful in plot, and is the best known of the works of Euripides.

IPHIGENIA AT AU′LIS (Gk. Ἰφιγένεια ἡ ἐν Αὐλίδι, *Iphigeneia hē en Aulidi*). A play by Euripides, produced after his death by his son in 405 B.C. Its subject is the intended sacrifice of Iphigenia, who is saved by Artemis by the substitution of another victim. The play, which is probably the last written by Euripides, seems to have been left unfinished. Of his tragedies, it alone has no prologue.

IPHIGÉNIE, ē′fē′zhā′nē′. A tragedy by Racine, dealing with the Greek story of Iphigenia, first produced at Versailles in 1674.

IPHIGENIE AUF TAURIS, ĭf′ē-gā′nĭe ouf tou′rĭs (Ger., Iphigenia in Tauris). A metrical drama by Goethe produced in 1789.

IPHIGÉNIE EN AULIDE, ē′fē′zhā′nē′ äɴ′-nō′lēd′ (Fr., Iphigenia in Aulis). An opera by Gluck (q.v.), first produced in Paris, April 19, 1774.

IPHIGÉNIE EN TAURIDE, äɴ tō′rēd′ (Fr., Iphigenia in Tauris). An opera by Gluck (q.v.), first produced in Paris, May 18, 1779.

IPHIGENIE IN DELPHI, ĭf′ē-gā′nĭe ĭn dĕl′fē. A dramatic poem by Friedrich Halm (1856), a continuation of Goethe's *Iphigenie*.

I′PHIS (Lat., from Gk. Ἶφις). A Cretan girl, brought up as a boy, betrothed to Ianthe, and at her mother's entreaty changed into a man by Isis on the wedding day.

IPIALES, ē-pyä′läs. A town of Colombia, situated in the western part of the Department of Cauca, on the frontier of Ecuador (Map: Colombia, B 3). It lies at an altitude of over 10,000 feet and has a customhouse. The population is estimated at over 10,000.

IP′OMŒ′A (Neo-Lat., from Gk. ἴψ, *ips*, worm + ὁμοῖος, *homoios*, like). A genus of the family Convolvulaceæ, differing very little from the genus *Convolvulus*, embracing about 400 species of tropical and warm-temperate plants. The species are mostly twining or trailing herbs and shrubs, although in the tropics a few become arborescent. Many are cultivated for their beautiful flowers, as the morning-glory and moonflower; others for their thick fleshy roots, as the sweet potato (*Ipomœa batatas*) and jalap (q.v.) (*Ipomœa purga*). The large fleshy roots of *Ipomœa batatilla*, *Ipomœa fastigiata*, and *Ipomœa digitata* are sometimes employed in the same way as sweet potatoes, and *Ipomœa megapotamica*, *Ipomœa cathartica*, and *Ipomœa jalapa* have properties similar to jalap, though less active. The ornamental species are very numerous and are easily cultivated. *Ipomœa quamoclit*, the cypress vine, beautiful in both flower and foliage, is a native of tropical America, but now well established in the warmer portions of the United States. *Ipomœa versicolor* and *Ipomœa purpurea*, natives of Mexico and tropical America, are among our most common morning-glories, the latter having escaped from gardens and become naturalized throughout nearly the whole country. The famous Japanese morning-glories are referred to *Ipomœa hederacea* by some authorities. There are many strains that have been developed by selection, some of them of very great beauty. The moonflowers are derived from *Ipomœa bona-nox* and *Ipomœa grandiflora*. The flowers open in the evening and close before noon of the next day. They are pure white or striped with green and very fragrant. *Ipomœa fastigiata* and *Ipomœa leptophylla*, both indigenous to the United States, are noted for their large fleshy roots, specimens weighing 20 pounds of the former and 100 pounds of the latter being not uncommon. They grow in dry soils, their thickened roots protecting them from injury by drought. *Ipomœa fastigiata*, known as man-of-the-earth and wild potato vine, in some regions is a troublesome weed, difficult of extermination on account of its huge roots. *Ipomœa arborescens*, a Mexican species, is a tree 20 to 30 feet high and a foot in diameter. See Plate of Dicotyledons.

IPPOLITOV-IVANOV, ēp-pŏl′ē-tōf-ē-vä′nōf, Michail Michailovitch (1859–). A Russian composer, born in Gatchina, Nov. 19, 1859. From 1875 to 1882 he was a pupil of the St. Petersburg Conservatory, where he studied composition under Rimsky-Korsakov. For the next 10 years he lived in Tiflis, in the Caucasus, as director of the conservatory and conductor of the symphony concerts and the opera, both affiliated with the Imperial Russian Music Society. During this stay he became deeply interested in the folk songs of the Caucasian district, especially those of Georgia. The results of these studies he published later in a book, *The Georgian Folk-Song* (in Russian), which has become the standard authority. Through the influence of Tschaikowsky he became in 1893 professor of composition at the conservatory in Moscow, and in 1906 succeeded Safonoff as director of that institution. After 1899 he was also conductor of the Moscow Private Opera, through which he greatly encouraged the efforts of the younger nationalist composers, although his personal sympathies inclined more towards the style of Tschaikowsky. His chief works are: the operas *Ruth* (1887), *Assya* (1900), *Yabava Putyatishna* (1901), *Treachery* (1911); a concert overture *Yar Khmel;* a symphonic scherzo; an orchestral suite, *Caucasian Sketches;* a sinfonietta; several cantatas and choral works, *a cappella* and with orchestra; chamber music of a very high order; songs; compositions for piano.

IPSAMBUL, ĭp′säm-bōōl′. See Abu-Simbel.

IPSARA, ĭp-sä′rȧ. See Psara.

IP′SUS (Lat., from Gk. Ἶψος). A town of Phrygia, Asia Minor, near the modern village of *Eski-kara-hissar*. It is noted for the battle (301 B.C., or, as Grote attempts to show, 300 B.C.) in which Antigonus and his son, Demetrius Poliorcetes, were overthrown by Seleucus and Lysimachus. Ipsus was the seat of a Christian bishop in the seventh and eighth centuries.

IPSWICH, ĭps′wĭch *or* ĭps′ĭch. A town of Stanley Co., Queensland, Australia, on the

Bremer, at the head of navigation, 23 miles west of Brisbane (Map: Queensland, H 9). It has manufactures of woolens, lumber, and ironwork, and, as the centre of a rich agricultural and coal-mining district, is a place of increasing business importance. In North Ipswich are large railway shops. Pop., 1901 (with suburbs), 15,246; 1911, 14,028, (with suburbs) 25,000.

IPSWICH. A municipal, county, and parliamentary borough, the county town of Suffolk, England, on the Gipping River, 11 miles northwest of Harwich (Map: England, H 4). The older portion of the town consists of narrow and irregular streets and contains many quaint old houses. Its notable public buildings include a modern town hall, corn exchange, an art museum, and the Tudor mansion in Christchurch Park. Among its educational institutions are the grammar school founded in 1477, an endowed girls' school, and a workingmen's college. It manufactures iron goods, railway supplies, fertilizer, bricks, sacking, agricultural implements, tobacco, clothing, shoes, and soap, and has shipbuilding establishments. Its docks and lock are commodious and admit vessels of 19-foot draft. The town owns profitable real estate, wharves, and markets, and maintains baths, free library with museum and school of science, and an arboretum with two well-laid-out pleasure grounds. Ipswich has sent two representatives to Parliament since 1447. It has Roman remains, but is first mentioned in 991 and 1000, when sacked by Northmen. Numerous charters date from the first granted by King John in 1199. Pop., 1901, 66,630; 1911, 73,932. In 1909 important anthropological discoveries were made. Consult John Wodderspoon, *History of Ipswich* (Ipswich, 1850), and "Manuscripts of the Corporation of Ipswich," in Great Britain Historical Manuscripts Commission, *Reports*, vol. ix (London, 1883).

IPSWICH. A town in Essex Co., Mass., on the Ipswich River, 28 miles northeast of Boston, on the Boston and Maine Railroad (Map: Massachusetts, F 2). It possesses the Heard Library, the Coburn Home for Aged Women, a House of Correction, and the Manning High School. The Ipswich Historical Society, founded in 1890, possesses a collection of old furniture, documents, etc., and its contributions to historical literature also are of value. There are planing and grist mills, some clam interests, and manufactures of hosiery, isinglass, heels, boats, and canoes. The government is administered by town meetings. Ipswich owns its water works and electric-light plant. Pop., 1900, 4658; 1910, 5777. Ipswich was settled as Agawam in 1633 by John Winthrop and 12 associates, and in the following year the Massachusetts General Court passed a resolution that "Agawam shall be called Ipswitch" (from Ipswich, England). When in 1687 Governor Andros levied an arbitrary tax, the town formally protested, on the ground that this tax "infringed their liberty as free English subjects of his Majesty, and the statute law that no taxes should be levied upon his subjects without the consent of an assembly chosen by the freeholders for assessing the same." Several of its citizens were thereupon arrested and punished, one of the judges asserting that English laws did not extend to America, and that colonists had no more privileges left them "than not to be sold as slaves." This was one of the earliest instances of Colonial resistance to arbitrary taxation. Ipswich was the home for a time of Nathaniel Ward, Anne Bradstreet, Nicholas Easton, William Hubbard, and John Norton.

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IPSWICH MAN. See MAN, SCIENCE OF, *Ancient Types*.

IQUIQUE, ė-kē'kā. A seaport and the capital of the Department of Tarapacá, in northern Chile, on the coast (Map: Chile, E 2). It is regularly built, but lies in such an arid district that its water supply is secured by an aqueduct from Pica, a distance of 88 miles. Inland are the famous saltpetre mines for which the town is the port, and with which it is connected by a railroad, and a few miles to the north are the famous silver mines of Huantajaya. The harbor is very well sheltered, but its rocky shore and the strong surf make it necessary for vessels to anchor a considerable distance from the shore. Besides saltpetre, the town exports borax, iodine, and copper ores. The imports are chiefly machinery and fuel for the mines. In 1911 the imports amounted to $27,975,005, and the exports to $64,849,196 (bulk saltpetre). It is the seat of a United States consul. Pop., 1914, estimated at 45,000. Iquique suffered from earthquakes in 1868 and 1877. It formerly belonged to Peru and in 1879 was the scene of a naval battle between Peru and Chile, being occupied by the latter in 1880. In 1891 it was bombarded and captured by insurgents against the Chilean government.

IQUITO, ė-kē'tō. An important tribe, living about the junction of the Napo River with the Marañon (Amazon), eastern Ecuador. They are expert spearmen and are noted for their making of *chicha* liquor, which they flavor with the twigs of a plant having the effect of an opiate. In religion they are still devoted to fetichism.

IQUITOS, ė-kē'tōs. A city of Peru, the capital of the Department of Loreto (Map: Colombia, C 4). It is situated on the Amazon River, 2500 miles from Pará, Brazil, at the head of navigation for ocean steamers, and has extensive docks for handling its trade. It is connected with Europe by three steamship lines with regular sailings. Above Iquitos the Amazon is navigable to river steamers for 425 miles. It is 1268 miles from Lima, the journey thence, by rail, mule back, and river steamer, occupying 17 days, which time will be reduced when the railway connecting the Amazon with the port of Paita, on the Pacific, is completed. It is the centre of a very extensive rubber trade, this product from the districts along the Huallaga, upper Amazon, and Madre de Dios rivers forming the chief export. It is the second port of Peru, having in 1910 imports to the amount of $4,373,946 and exports, $5,428,064. It is the seat of a United States consul. Iquitos was founded in 1863 for the purpose of having a port in direct connection with the Atlantic Ocean. It has a mean annual temperature of 75° F. Pop., 14,000.

IRADE, ê-rä'dâ (Turk. *irādah*, will, desire). An Imperial decree promulgated by the Sultan of Turkey and corresponding to the European order in council.

IRAK, ê-räk'. The name of an indefinitely bounded region extending on both sides of the confluence of the Euphrates and the Tigris, from the Syrian desert northeastward to the Elburz Mountains, on the south shore of the Caspian Sea (Map: Turkey in Asia, E 4). The region consists chiefly of sandy desert lowlands in the west, called Irak-Arabi, and in the east a region of parallel ridges and furrows, mostly barren, with fertile river valleys, called Irak-Ajemi. Irak-Arabi is nearly coterminous with ancient Babylonia and includes parts of the modern Turkish vilayets of Bagdad and Basra. It includes the ruins of the ancient cities of Babylon, Seleucia, and Ctesiphon, and the modern cities of Bagdad, Basra, and Kerbela (Meshed Hussein). Irak-Ajemi coincides nearly with the ancient Media and includes a large part of western and central Persia, containing its largest and most flourishing cities, Ispahan, Teheran, and Hamadan. The population of the whole of Irak is estimated at about 3,000,000. The inhabitants of the western part are largely nomadic.

IRAK-AJEMI, -äj'*e*-mē'. See IRAK.

IRAK-ARABI, -ä'rȧ-bē'. See IRAK.

IRAN, ê-rän'. The native name of Persia, in its broadest sense. (See PERSIA.) The word *Irān* itself, in its modern form, is earlier found as *Erān* (whence often Eranian as an adjective), and it is ultimately connected with *Aryan* (q.v.) as a racial designation. In the *Avesta* (q.v.) the people speak of themselves as *Airyå daínhavō* (Aryan nations), and *Ariya* in the Old Persian cuneiform inscriptions is employed in the sense of what we should to-day call Persian in the larger application of the term. As a more or less defined unit in ancient and modern times, the land of Iran is important geographically, ethnologically, historically, and linguistically.

Geography and Ethnology of Iran. As far as modern times are concerned, the more important geographical and ethnological points connected with Iran will be found treated under PERSIA. In remote times, as later, the Iranian boundaries comprehended the entire region from the Caucasus, the Caspian Sea, and Russian Turkestan on the north, to the Tigris, the Persian Gulf, and the Arabian Sea on the west and south, and extended to the Indus on the east, likewise comprising the modern Afghanistan and the territory to the north of it as far as the Jaxartes River (Sir Darya). The wide extent of this area showed as great a variety of climate, extremes of heat and cold, in antiquity as at present, and presented considerable diversity of features and characteristics. While the larger part of the country has ever been marked as highland or mountainous, there are extensive low or depressed tracts, with salt deserts and arid wastes alternating with swampy districts and plains. What we know of the country in antiquity shows that it was generally fertile and well wooded in parts; but irrigation is not infrequently referred to. With regard to territorial distribution in ancient times, it may be added that in the *Avesta* the lands on the west which came more prominently into notice were the country known in history as Media (q.v.), including Azerbaijan or Atropatene (q.v.), and the districts about the Caspian Sea, and on the east, Bactria (q.v.), including the modern territories of Khorassan and Seistan, together with parts of the present Afghanistan. Persis (ancient *Pārsa*), or Persia proper, is first mentioned at the time of the founding of the Achæmenian kingdom. (See ACHÆMENES.) From that time the real history of the Iranian Empire as a whole begins. Ethnologically the Iranian people are members of the Aryan or Indo-Germanic family. The general Iranian type may be deduced by a comparison of the racial features of the Persians, Kurds, Ossetes, Baluchis, Afghans, and inhabitants of the Pamir districts. The Iranian type, however, has been somewhat affected, even from the earliest times, by admixture with the adjoining Semitic, Turanian, and Indian tribes that border on the land itself. On the other hand, the spread of Iranian blood beyond its own country may be recognized, e.g., among the people of northwestern India. Similarly, Iranian lineaments, like linguistic traits, may be found penetrating into Armenia and Asia Minor, even from a remote period in the past. When the gradual dispersion of the Aryan or Indo-Germanic tribes took place in prehistoric times, it is presumed that the Iranians may have entered the great plateau from the north, on the west of the Oxus and Jaxartes, and have thus begun their advance into the country that later became their habitat. Linguistic, mythological, and religious evidences prove that they must long have remained in union with their Indian cousins.

History of Iran. The beginnings of Iranian history are shrouded in darkness, although the existence of an ancient kingdom in Bactria is inferred from early Oriental and classical references. (See BACTRIA.) With the Median kingdom, however, we are on historic ground, even though the early tradition of a Median conquest of Babylonia (2400 B.C.) as recorded by Berosus (q.v.) may not be authentic. Nevertheless, with the presumed advance of the Iranian peoples westward in their land, the Medes came earliest into real prominence, and though subject to Assyria for centuries, they were able to throw off the Assyrian yoke about the ninth century B.C., and real unity was given to the Median kingdom in the eighth century by Deioces, an able Iranian monarch. (For the subsequent history of the kingdom, see MEDIA.) The account of the overthrow of the Median dynasty by Cyrus (about 550 B.C.), and the events which led to the founding of the great Persian Empire of the Achæmenian kings, and to its fall through Alexander the Great, will be found in the several articles devoted to those topics. The Seleucid dynasty (see SELEUCIDÆ) swayed the fortunes of Iran for about 70 years and gave place to the Parthian dynasty of the Arsacidæ (q.v.), which reigned for nearly five centuries (250 B.C.–226 A.D.). This rule yielded in turn to the Iranian monarchy of the Sassanidæ (q.v.). The overthrow of this house by the Arab Mohammedan invasion in the seventh century changed the history of Iran, nationally, religiously, and linguistically. For details of these events, consult the article PERSIA.

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IRA′NIAN, or **ERANIAN**. The term applied to peoples, some of which are now almost or altogether extinct, speaking languages belonging to the Aryan stock and inhabiting the plateau lying between Asia Minor and the Caspian on the west and the Hindu Kush Mountains on the east (of which modern Persia forms the chief part). The chief Iranian peoples, which number some 15,000,000 members, are the Persians (Tajiks of the East; Hajemis of the Caspian littoral, and the Teheran-Ispahan country; Parsis, now principally resident in western India, but also in the region between Ispahan and the Persian Gulf), ancient and modern, and the old Bactrians, whose descendants are said to speak still a purer Persian than that in vogue in Persia itself, together with the partly civilized Kurds; while the Tats and Azerbaijanis, the Sarts of Russian Turkestan, and certain portions of the population of Afghanistan, Baluchistan, etc., are physically Persians who speak, more or less, Turkic dialects. Earlier authorities classed the Armenians with the Iranians, but it is better to regard them as independent members of the Aryan stock. The Ossetes are generally regarded as Iranians. The mass of the Aryan tribes of Afghanistan and Baluchistan, by some considered Iranian, show, on the whole, greater affinities with the Aryans of Hindustan. The Golchas of Pamir are rather an independent Aryan branch than a subdivision of the Iranians. Müllenhoff and V. Miller have shown that many place names in southern Russia are of Iranian, and especially Ossetian, origin, and this agrees with the theory which considers the bulk of the Scythian peoples to have been Iranian. From the dawn of history the land from the borders of Asia Minor to the mountains of Pamir has been inhabited, generally speaking, by tribes and nations of Aryan stock, and chiefly of the variety called Iranian. Even beyond the Oxus, the traditional frontier between Iran and Turan, Iranian culture, old and new, can be traced beyond the borders of China, and no doubt some of the nomad hordes who hovered about western Europe were not all Turanian in their make-up. Within the Iranian area many blends exist. Besides the descendants of the Aryan Medes and Persians of a fairly pure strain, and the purer Eastern Iranians, almost every people of Asia Minor and of Central Asia has added its quota to the hybrid populations. Mongolian, Arabian, Turkish conquests, and the commercial and colonizing instincts of Jews, Armenians, natives of the Caucasus, etc., have also contributed their share to the mixture. War, slavery, and peaceful nomadism have likewise helped, both in ancient and in modern times. The range of culture of the Iranians is very extensive, reaching from the civilizations of ancient Bactrians, Medes, and Persians (and their modern representatives) to the half-savage seclusion and isolation of some of the small hill communities. Most authorities do not assign to the Iranians as high a rank intellectually as is possessed by the Aryans of India or by the Semites, to say nothing of the Aryans of Europe. The situation of the plateau of Iran between India and China on the one hand and Asia Minor and Arabia on the other has made it inevitably an absorber and a transmitter of culture, a highway of commerce, and a theatre of religious disputes. The great mass of the Iranians are now professors of Islam, but of the Shiite or "unorthodox" sort—a protest, as it were, of the Aryan against the Semitic mind. The ancient Aryan religion, Zoroastrianism, indigenous to the Eastern Iran, with its dualism and reverence of fire as the sacred symbol, exercised considerable influence upon the Hebrews.

Some of the Iranians (Persians and Parsis in particular) have from time immemorial been devoted to commerce, and have spread Persian influence to the Red Sea on the west, and to the western shores of India in the other direction, while northward they have carried it into Siberia and China. The best side of the Iranians of the present time is seen in the educational and charitable activities of the great Parsi merchants of India, who in many respects are setting examples for the whole world. The worst is seen in some of the aspects of Persian tyranny. All grades between still exist here and there over the wide Iranian land. The Iranians in general are judged by Ripley to belong physically to the "Mediterranean" race, their ideal type represented to a certain extent by the Farsis about the ancient Persepolis and the Luris of the mountains of western Persia, having been modified in the southwest by the Semitic intruders, in the east and northeast (the mass of the people) by Mongolian admixture, and on the littoral of the Arabian Sea towards the southeast by Indian, or perhaps Negritic, additions. See Iranian Languages; Indian Peoples.

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IRANIAN LANGUAGES AND LITERATURES. Historically, the linguistic and literary monuments of Iran cover a period of more than 2500 years, dating from the early Zoroastrian scriptures and the Old Persian cuneiform inscriptions, through the Pahlavi, down to Modern Persian literature. From the standpoint of speech the Iranian tongues are most closely allied to the Indic languages, and together they make up the Indo-Iranian group. (See INDO-IRANIAN LANGUAGES.) Three great periods in the development of these tongues may be recognized—Old Iranian, Middle Iranian, and New or Modern Iranian. 1. The first of these, the Old Iranian period, includes the *Avesta* (q.v.) and the cuneiform inscriptions and antedates the Christian era by fully six centuries, although it probably extended into the fourth century A.D. There is practically a barren period of five centuries during the Parthian sway, from the third century B.C. to the early part of the third century A.D., during which time there are no real literary monuments, although possibly some later Avestan texts may have been composed, and certain inscriptions and devices in coins may be cited as helping to eke out our knowledge of the Old Iranian period till the rise of the Sassanian monarchy (226 A.D.). 2. The Middle Iranian period dates from the latter event and extends to about the ninth or tenth century of our era. It is represented by the language and literature known as Pahlavi (q.v.), including Huzvaresh, Pazand, and Parsi. 3. The New or Modern Iranian period begins practically in the tenth century A.D., with the rise of the Modern Persian language and literature (q.v.) under Firdausi (q.v.) and his immediate predecessors. Within this period, besides the New Persian, there come the various modern Iranian languages and tongues, Afghan, Baluchi, Kurdish, Ossetish, the dialects of the Pamir and Caspian districts, and the dialects of Central Iran. All the Iranian languages have certain phonetic characteristics which mark them and distinguish them from the kindred group of Indic tongues. Most conspicuous among these are: (1) the change of Indo-Germanic *s* into Iranian *h;* e.g., Skt. *samá*, 'same,' 'like,' 'all' = Av. *hama*, OPers. *hama*, Phl. *hamak*, Paz. *hamā*, NPers. *hamah*, Bal. *hama(k)*, Kurd. *hamū;* (2) the presence of the voiced sibilants *z, ž*, e.g., Skt. *jānu*, 'knee' = Av. *zānu*, Phl. *zānūk*, NPers. *zānū*, Afgh. *zangūn*, Bal. *zān*, Kurd. *zān;* Skt. *bāhú*, 'arm' = Av. *bāzu*, Phl. *bāzīh*, *bāzuk*, NPers. *bāzu;* Skt. *mṛḍīká* (Vedic *mṛḷīká*), 'mercy' = Av. *marəẓdika;* (3) the use of spirants instead of aspirates, as well as a general tendency to spirantization (*th*, *θ*, *gh*, *γ*, etc.); (4) there are numerous minor phonetic, morphological, and syntactical features which can be discussed only in a technical treatment of the individual languages concerned. The details regarding the various Iranian literatures, Avesta, Old Persian, Pahlavi, etc., will be found in the separate articles devoted to those subjects. The modern Iranian languages are written in the Arabic script, the ancient Persian inscriptions in wedge-shaped letters borrowed from the Babylonian characters, while the Pahlavi and Avesta are in a script based on the Semitic writing and read from right to left.

Consult linguistic monographs in Geiger and Kuhn, *Grundriss der iranischen Philologie* (Strassburg, 1895–1904), full bibliographies; Gray, *Indo-Iranian Phonology* (New York, 1902); Bartholomæ, *Altiranisches Wörterbuch* (Strassburg, 1904); *Avesta, Pahlavi and Ancient Persian Studies in Honor of P. Sanjana* (ib., 1904); *The Spiegel Memorial Volume*, edited by J. Modi (Bombay, 1908).

IRAPUATO, ē′rȧ-pwä′tō. A district town in the Mexican State of Guanajuato, situated on the National Railways of Mexico, 33 miles from Guanajuato, the capital of the state (Map: Mexico, H 7). Its climate is so equable that strawberries are marketed the year round. It has a number of old convents and churches. Pop., 1900, 19,640; 1910, 21,469.

IRAWADI, ĭr′ȧ-wä′dĭ. A river of Farther India. See IRRAWADDY.

IRBIT, êr-bêt′. The capital of a district in the Russian Government of Perm, situated at the confluence of the Irbit with the Nitza, 110 miles northeast of Ekaterinburg (Map: Russia, K 3). It is famous chiefly for its annual fair, instituted in 1643 and second only to that of Nizhni Novgorod. It lasts the whole month of February and is visited by about 20,000 people. The chief articles of commerce are manufactures from Russia, silk, woolen, and cotton goods, trinkets, drugs, groceries, fruits, wine, and tea; hides and pelts from Siberia. The annual value of goods brought to the fair exceeds $20,000,000. Irbit was founded by the Tatars in 1633. Pop., 1897, 20,064.

IREDELL, ĭr′dĕl, JAMES (1750–99). An American jurist, born in Lewes, England. He was the son of a wealthy and influential English merchant largely engaged in the American trade, who secured for him a position in the customs service of North Carolina. He entered as a deputy collector in 1767, finally becoming in 1774 collector of royal customs for the entire Colony. Meanwhile he had studied law and had been admitted to the bar. In the pre-Revolutionary controversies between England and the colonists he openly showed his sympathy with the cause of his adopted country, resigned the collectorship, and entered enthusiastically into the work of organizing the Revolutionary government. The necessity for a reorganization of the law courts appealed to him particularly, and to this work he devoted his best efforts. In December, 1777, he was chosen a judge of the North Carolina Supreme Court, and in 1787 was commissioned by the Legislature to revise and codify the statutes of the State, which resulted in the important publication known as *Iredell's Revision of the Statutes of North Carolina* (1791). He was an ardent Federalist, but with his political associates could not overcome the opposition which prevented North Carolina from accepting the Constitution until several months after Washington's inauguration. In February, 1790, he was named by President Washington as associate justice of the United States Supreme Court, in which capacity he served until his death. Consult McRee, *Life and Correspondence of James Iredell* (New York, 1857).

IREDELL, James (1788–1853). An American jurist and legislator, son of James Iredell, associate justice of the United States Supreme Court. He was born at Edenton, Chowan Co., N. C.; graduated at Princeton in 1806; studied law; and was admitted to the bar in North Carolina. In the War of 1812 he raised and commanded a company of North Carolina volunteers. His political career began in 1816, with his election to the State Legislature. To this body he was repeatedly reëlected, was Speaker of the Lower House in 1817–18, and, with the exception of a short term on the bench of the Superior Court in 1819, served until his election as Governor of the State in 1827. In the following year he succeeded Nathaniel Macon in the United States Senate, serving until 1831, when he retired permanently from public life and resumed the practice of law. He was a commissioner to revise the statutes of North Carolina, the result of his labors being the publication of the *Revised Statutes* (1836–37), and as the reporter for the Supreme Court of the State for many years he compiled 21 volumes of *Reports*. He also published a *Treatise on the Law of Executors and Administrators* (1837) and *Digest of Reported Cases in the Courts of North Carolina, 1776 to 1845* (1839–46).

IRELAND, īr'land. The smaller of the two great islands forming the United Kingdom of Great Britain and Ireland. It rises from the continental shelf amid shallow waters, the line marking a depth of 600 feet running from 25 to 100 miles west of the Irish coast. Beyond this line the bed of the Atlantic slopes rapidly to oceanic depths. Ireland is thus essentially a part of Europe and lies on the western rim of the mighty land mass of Eurasia. Its area is 32,586 square miles, including about 500,000 acres in water areas. Ireland extends through nearly four degrees of latitude, from the parallel of 51° 26′ N. to that of 55° 21′.

Topography. On the east, along the waters of the Irish Sea and St. George's Channel, which separate Ireland from England and Wales, the coast, of softer rock than that of the west, is comparatively straight for long stretches and has few deep indentations. On the west, however, where the coast, of hard rock with drowned valleys, is exposed to the gales of the Atlantic, the sea penetrates far into the land through long, deep valleys. These valleys are true fiords like those of the west coasts of Scotland and Norway, and, as in those countries, at the entrance to the inlets and all along the coast there are steep cliffs and hundreds of little islands that were torn from the mainland mass by ocean storms and other destructive influences. The northwest edge of Europe, therefore, has the same general characteristics from Bantry Bay, at the southwest corner of Ireland, to the North Cape, far north of the Arctic circle in Scandinavia. The chief ports of Ireland are Belfast and Dublin on the east coast, Waterford and Cork on the south, and Londonderry on the north. The west-coast ports are of little importance except in the coasting trade.

In its general surface Ireland may be described as basin-shaped. A traveler sailing along the coast waters might get the idea that Ireland is very mountainous. As he nears the coast from Holyhead—the common route from England to Dublin—he sees the blue line of the Wicklow Mountains rising 2000 feet above sea level. The details come into view as he approaches Dublin. He sees the rounded bosses of Killiney and the grim promontories of Howth and Bray, which are only the outliers of the high granite moorlands that stretch away for 70 miles to the south. Farther north, between Dundalk and Dundrum bays, he sees a still more rugged and picturesque coast, with the huge domes of the Mourne Mountains rising above it; and then at Belfast come into view the long, black scarps, terraced and uninviting, which form the edges of the high plateau behind them. Rounding the north coast, he sees along the Atlantic shores of Donegal and Mayo great walls of rock, 2000 feet high in places, the finest cliffs in the British Isles; and down the west coast are the rugged heights of Connaught, the high limestone terraces of northern Clare, and farther south range after range extends along the shores till they culminate in the gray masses that look down on Bantry Bay. The highest peak is Carrantuo Hill (Carran Tual), near the picturesque Lakes of Killarney, which has an elevation of 3414 feet above sea level. The interior of the northern portion of the country, from the latitude of Belfast, is partly broken and mountainous. The same is true of the southern part of the island a little south of the latitude of Dublin. The uplands are not comparable, however, to the Scottish and Welsh highlands, but resemble rather the hills of the Scottish lowland.

Broadly speaking, therefore, the highlands of Ireland are massed upon its margin. The central area, the largest single feature of the topography, is a plain with a breadth of 50 miles and an extent from east to west of 100 miles or more, in which numerous bogs and lakes have formed. When the traveler crosses Ireland, from Dublin to Galway (115 miles), e.g., he meets scarcely a hill on the way. He may travel over large parts of the central regions and feel himself on a great plain above which hills or ranges of elevated surface rise here and there, though they are quite insignificant in comparison with the wide expanse of brown bog or level meadowland.

Hydrography. So much of the high ground is for the most part insular masses with ill-determined divides that the river courses in most portions present no uniformity of system. The rivers, sometimes exhibiting sharp changes in trend, yet flow towards all the surrounding seas, even penetrating the coast highlands from the central plain, most of which is not over 500 feet above sea level. It is possible to go from the central plain to the sea by 12 lines through the hills without exceeding an elevation of 300 feet. The water parting between the eastern and western rivers may be traced from Lough Foyle to Mizen Head, but it is a winding line, marked by no definite and determining surface features.

The rainfall is abundant in the central plain, with the result that the slow-moving rivers widen into long lakes, or loughs. The Shannon and Erne rivers are chains of such lakes joined by stretches of river, the river sections being not very much longer than the lakes. The northern part of the central plain is drained by the Erne. The centre of the plain is drained by the Shannon, which empties into the Atlantic through a wide estuary 70 miles in length. The Shannon, 250 miles long, is the longest river in the United Kingdom. Nearly half of it above the estuary is made up of the three lakes Allen, Ree, and Derg. All the most important rivers flow from the plain, the mountain streams on the coast sides being too limited in length and drainage area to have large volumes. Some of the plain streams, like the Boyne, have no lakes in their courses. A few of these sluggish rivers serve as means of communication with the interior, and their usefulness is augmented by the considerably developed canal system of the country. The Shannon River, navigable by large steamers for 129 miles, is connected with Dublin by the Grand and Royal canals, thus affording water communication across the island. Bogs covering a large part of the plain are the source of peat, so extensively used in Ireland for fuel. The Bog of Allen, to the east of the centre of the plain, is the most extensive of these wet, barren regions.

Climate. The most potent factor in determining the climate of Ireland is the Atlantic Ocean. The prevailing west winds blowing over the broad expanse of water are tempered by the influence of its comparatively warm surface, so that the mean winter temperature of Ireland, ranging from 40° F. to 45° F., is 20° F. to 30° F. higher than that of places on the same parallels of latitude in America and in west Russia. The influence of the equable sea climate is also very pronounced in summer, the mean summer temperature of Ireland, 59° F. to 62° F. being from 5° F. to 10° F. lower than that of east Prussia. Ireland has the greatest advantages, both as to temperature and rainfall, that an insular climate affords. It also has the disadvantages, as, e.g., the unpleasant damp winds that sweep in from the ocean and the fog and mist that hang around the flanks of the hills. In the south the average sunshine is 1400–1600 hours per year, while in the north this diminishes to 1200. The large average rainfall clothes Ireland with the vivid garb of green that has made it known as the Emerald Isle. The rainfall, averaging 40 inches per year, is quite uniformly distributed; the western hills, averaging a trifle higher than the central plains, do not stop the rain-bearing winds.

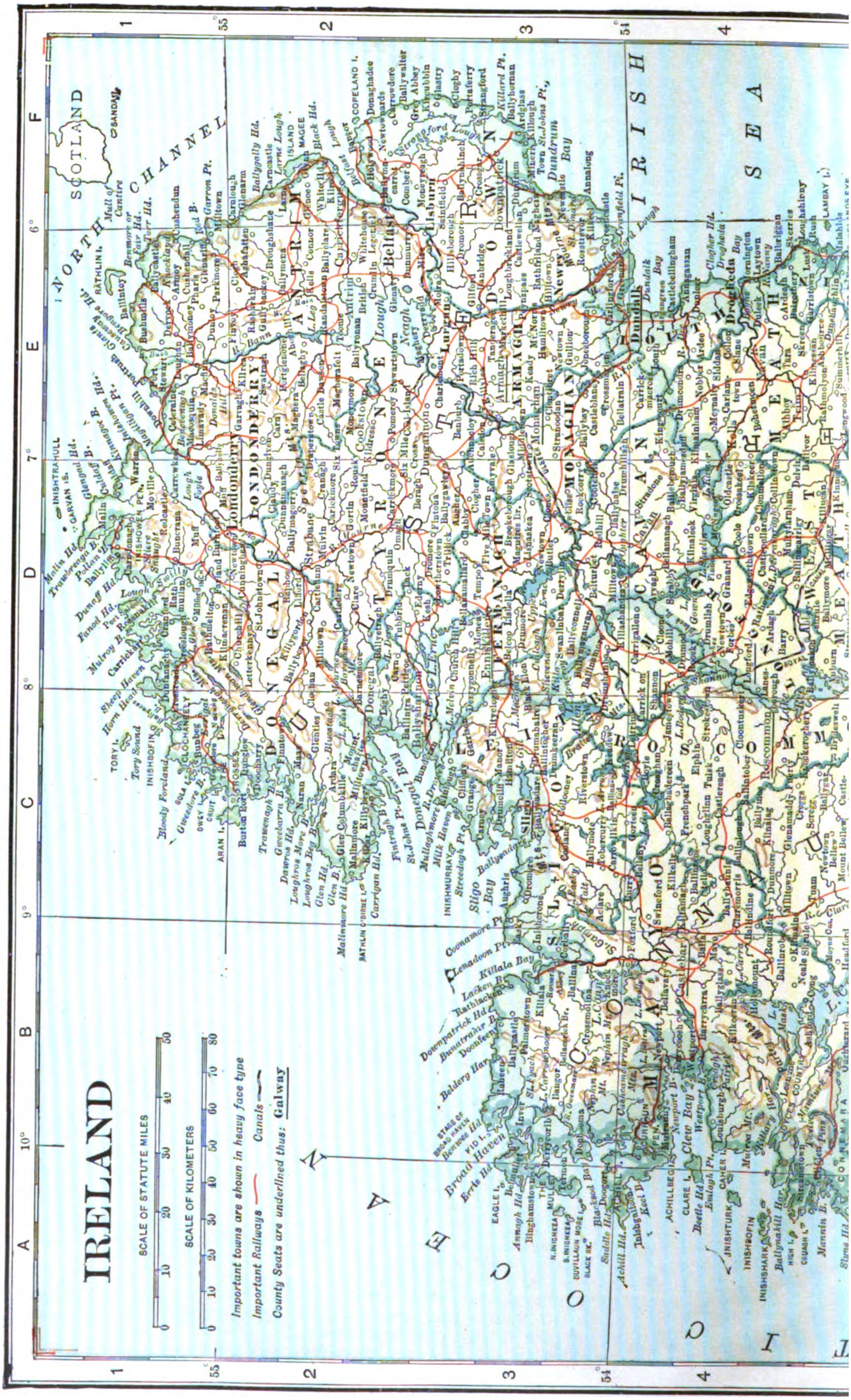
Soils. The fertility of Irish soils has long been recognized. About half of the island is formed of limestone, whose soils are proverbially rich. The red marls, calcareous grits, slate, and igneous rocks have also contributed fertilizing elements. The fact that the former glacial conditions transported the rocks of many localities and mixed them with those of others has, as in England, been very beneficial to the agricultural interests. Thus limestone detritus from the central plain was spread over hundreds of thousands of acres outside of it, contributing elements of fertility which the local rocks did not possess. In some regions the soil is naturally poor, and in many others bad tillage or overcropping has reduced fertility. Bog and barren mountain lands cover about one-fifth of the total area.

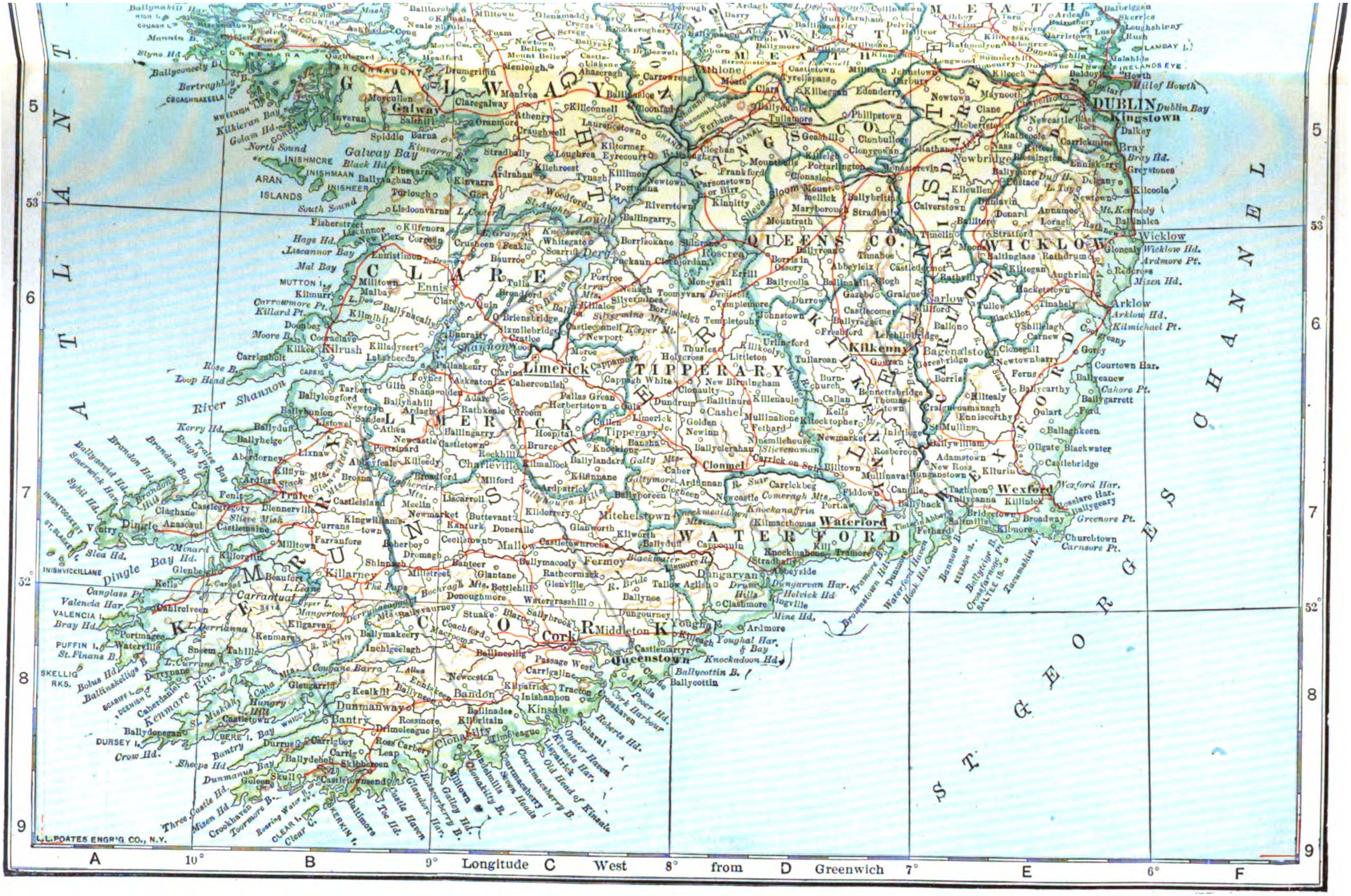
Flora. The Irish flora consists largely of English migrants, and England in turn derived most of her flora from the neighboring continent. The sedges, rushes, and ferns are most abundant in the wetter west. Grass is by far the largest product of the soil in every county of Ireland. The pastoral lands (permanent grass) include about four-fifths, and the arable lands (cereal, root, and fibre crops, and hay under rotation) one-fifth, of all lands utilized for agricultural and stock-raising purposes. The forests (chiefly oak and beech in the lower grounds and birch and pines in the higher regions) cover only a very small part of the area.

Fauna. The fauna differs in no marked degree from that of England or France and is largely a thing of the past. The great Irish deer and the garefowl (q.v.) were exterminated in prehistoric times, and since civilization began Ireland has lost its bear, wolf, wild cat, beaver, native cattle, and other species of mammals and birds. Nothing remains except the small rodents of the woods and fields and such small birds as belong to the fields, gardens, and seashore. The popular saying that there are no snakes in Ireland is true, but there are none in Scotland and only two species in England. The only reptile is the lizard. British standard works on natural history cover Ireland, but it has had also a special treatise of high repute in Thompson, *Natural History of Ireland* (London, 1849–51). The fact that there are fewer species both of plants and animals common to the Continent and Ireland than to the Continent and Great Britain points to an earlier separation of Ireland from Great Britain than of Great Britain from continental Europe.

Geology. The central plain of Ireland is underlaid by limestone strata belonging to the basal portion of the Carboniferous system. Upper Carboniferous rocks, including the coal measures, were originally developed on an extensive scale, but they have been removed by erosion and are now found in only a few localities. The highlands bordering and partially inclosing the central plain have a more varied character. In the northwest—in Donegal, Derry, Mayo, and the District of Connemara—the mountain axis consists of crystalline rocks, which give way on the flanks to upturned Paleozoic sediments. This structural type is repeated in the southeast, in the highlands of Leinster. The northern counties are floored largely by Silurian rocks, although there are small areas where the Permian, Cretaceous, and Triassic formations outcrop. The Giant's Causeway (q.v.) and the bold cliffs of the north coast owe their character to basalt intrusions. In the southwest highlands the Old Red Sandstone appears along the central ridges, which are the axes of anticlinal folds, while the synclinal folds consist of Carboniferous limestone.

Mining. Irish coal resources are insignificant compared with those of Great Britain—a fact which has placed Ireland at a serious industrial disadvantage. During the last years of the nineteenth century about 24 mines were in operation, employing 1000 persons and yielding about 125,000 tons annually; in 1913 the output was 82,521 tons, of which County Kilkenny furnished 48,082 tons. The coal mines employed 576 persons underground and 194 above ground. The greater part of the output of coal is of the anthracite variety. The iron-ore resources are more considerable, but in the absence of coal have not been extensively exploited. The annual output during the last years of the nineteenth century was about 100,000 tons. In 1913 the output was 60,014 tons, almost the whole of which was mined in County Antrim. The mining of copper, which was of some im-


IRELAND
SCALE OF STATUTE MILES
0 10 20 30 40 50
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80
Important towns are shown in heavy face type
Important Railways
Canals
County Seats are underlined thus: Galway
NORTH CHANNEL
IRISH SEA
OCEAN
SCOTLAND


ATLANTIC
ST. GEORGES CHANNEL
GALWAY
CONNAUGHT
CLARE
LIMERICK
TIPPERARY
KERRY
CORK
WATERFORD
KILKENNY
QUEENS CO.
KINGS CO.
KILDARE
WICKLOW
CARLOW
WEXFORD
MEATH
WESTMEATH
DUBLIN
Kingstown
Galway
Galway Bay
ARAN ISLANDS
Limerick
Ennis
River Shannon
Cork
Queenstown
Waterford
Wexford
Kilkenny
Clonmel
Tralee
Killarney
Bantry
Kinsale
Wicklow
Arklow
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portance for many years, has almost ceased, only 778 tons of ore being mined in 1912. In 1913 the aggregate value of all minerals was £228,210.

Fisheries. The fishing industry, stimulated by a system of bounties and the necessity of drawing upon the resources of the country in consequence of the growth of population, was very active from about 1800 to 1829, when it employed 64,771 men, but the cessation of the bounties in that year caused a decline. Still more disastrous was the result of the famine period (1846), due to the blight and failure of the potato crop, and only in recent years has there been a revival in the industry. Deep-sea and coast fishing employed 4827 vessels and 19,523 men in 1912, as against 6458 vessels and 24,528 men in 1881. The total annual value of the catch, including shellfish, fluctuates about £400,000. It was £280,945, excluding shellfish, in 1913. Salmon fishing is pursued along the rivers and coasts, employing from 12,000 to 14,000 men and yielding an annual product of about £300,000. The haddock fisheries are carried on in the region to the east of the Leinster coast, hake fisheries on the south coast, and mackerel on the west coast. The revival of the fishing industry has been greatly encouraged by the government as one of the means of bettering the conditions of the poverty-stricken population. Piers and harbors have been built for the benefit of fishermen, money loaned them, and their interest protected by close inspection.

Agriculture. As a result of natural and historical conditions, the industrial activity of Ireland is largely confined to agriculture. Few countries have so large a percentage of area adaptable for cultivation. Most of the waste lands are in the mountains of west and south Ireland, though there is still much unreclaimed boggy area in the lowlands. The lowland region is naturally of a high degree of fertility. The climate is warm and humid, and consequently favorable to the growth of most plants, though the humidity is too great in some regions to allow wheat to ripen properly. While the country is favored by nature, the Irish system of agriculture does not result in the general welfare of the people, as may be understood in a study of Irish history. One of the features of the English subjugation of Ireland was the confiscation of the greater portion of the land and the granting of it in large dimensions to English citizens. These in many instances were nonresidents, and even when residents they did not always succeed in establishing cordial relations with the tenantry, who were not forgetful of the manner in which the landlord (as a class) came to his possession. During the eighteenth century Ireland was placed under the ban of the English commercial and colonial policy, and Irish agricultural products were excluded from the English markets. Later these restrictions were removed, and the high prices of the Napoleonic war period gave a decided impetus to agriculture. During the first part of the nineteenth century there was a general movement towards the division of the farms into small holdings—the result largely of the landlords' desire to secure greater political strength through the increase in the number of ballots, and of the extensive practice of subletting indulged in by the middlemen.

HOLDINGS. (IN ACRES)

PROVINCES	Not exceeding 1 acre	From 1 to 5 acres	From 5 to 15 acres	From 15 to 30 acres	From 30 to 50 acres	From 50 to 100 acres	From 100 to 200 acres	From 200 to 500 acres	Above 500 acres	Total
Leinster..........	30,644	17,338	24,946	22,253	15,496	14,434	6,928	2,731	436	135,206
Munster..........	27,587	12,862	19,764	24,524	22,803	23,380	9,484	2,622	391	143,417
Ulster..........	22,035	20,126	62,823	53,604	25,436	14,845	3,662	975	315	203,821
Connaught..........	7,185	11,940	46,225	36,945	12,960	6,599	2,654	1,393	451	126,352
Totals for Ireland	87,451	62,266	153,758	137,326	76,695	59,258	22,728	7,721	1,593	608,796

The potato blight of 1845 precipitated a crisis, and important changes date from this event. In great measure it marked the beginning of the end of the small holding and the change from tillage to pasturage. The repeal of the Corn Laws aided in the relief of the Irish, but later so diminished the value of Irish cereals in the English markets that the landholders in the lowland regions evicted their tenants and turned the lands into pasture fields. The evicted tenants had to seek a location in the less desirable regions. In Ulster the tenant fared somewhat better; for there custom had long recognized a sort of tenant right, which operated to restrict the privileges of the landlord. The great diminution of the population through emigration had the effect of providing more labor for those who remained, though too often the location of the laborer was remote from the labor. On the whole the condition of the peasantry improved. But the fact that tenant and landlord were of different race and religion still prevented the development of sympathetic and harmonious relations between the two, and the prevalence of tenantry at will resulted in an aggravating uncertainty of tenure and prevented the discouraged tenant from making such effort to improve his holding as his interests demanded. Accordingly the land question persisted and became more serious. Relief was sought through the legislative Act of 1870, granting compensation for improvements and for the disturbance occasioned by removal, and through the Act of 1881, which provided for a fair rent, fixity of tenure, and free sale.

The period for which rent might be fixed according to the Law of 1881 was 15 years, at the conclusion of which time it might be fixed again for another 15 years. From 1881 to 1900 the number of holdings for which the rent was fixed for the first 15 years was 328,720, embracing 9,859,970 acres, the per cent of the reduction in rent being 20.8. Those upon which rent was fixed for the second 15-year period during that time was 52,396, embracing 1,432,615 acres, upon which there was an additional rent reduction of 22 per cent.

Still more radical was the policy of enabling the peasant to purchase land. The government advances money for the purchase, and the peasant pays the government in annual installments for a term of years. In accordance with the Acts passed from 1870 to 1896, there had been advanced for land purchase, up to March 31, 1913, the sum of £24,779,176, and 2,508,937 acres of land purchased. Under the Laws of 1903 and 1909 the moneys advanced totaled £59,163,128, and the area purchased, 5,725,984 acres. For further particulars, see IRISH LAND ACTS.

The table on page 333 gives the number of holdings by provinces, grouped into nine different classes (1912).

Compared with 1904, there has been a decided increase in the holdings of less than one acre (11,750), and an increase in the groups of 50 to 100 acres, and above 500 acres. Farms in the group 30 to 50 acres increased in number 2366; 50 to 100 acres, 1575; 100 to 200 acres decreased 205 in number; and the number in the group above 500 increased 66. The 1 to 5 acre group increased 81 in number; the group 5 to 15 acres decreased 532, and the group 30 to 50 increased 2366.

With regard to the change from tillage to pasturage since the famine, the decrease was greatest for cereals. This acreage was 2,832,564 in 1855 and only 1,265,687 in 1912. The decrease in the green crops was also large, the total acreage being 1,444,390 in 1855 against 1,022,089 in 1912. The meadow crops increased during the same period from 1,314,807 to 2,487,349 acres. The following table shows in more detail the changes which took place in the period 1855 to 1912:

YEAR	Oats (acres)	Meadow (acres)	Wheat (acres)	Barley (acres)	Flax (acres)	Potatoes (acres)	Turnips (acres)	Mangold and beetroot (acres)	Total (acres)
1855	2,118,858	1,314,807	445,775	226,629	97,075	982,301	366,953	22,567	5,574,965
1890	1,221,013	2,093,634	92,341	182,058	96,896	780,801	295,386	46,457	4,808,586
1901	1,099,335	2,178,592	42,934	161,684	55,442	635,321	289,759	77,457	4,540,524
1905	1,066,806	2,294,506	37,860	154,645	46,158	616,755	282,105	72,570	4,571,405
1912	1,046,000	2,487,349	44,855	165,367	55,062	595,184	271,771	81,700	4,747,288
Per cent increase or decrease, 1855–1912	−50.6	+89.2	−89.9	−27.0	−43.3	−39.4	−25.9	+262.8	−14.8

It will be seen that the largest actual decrease was shown by oats, but the largest per cent decrease was in wheat, the growing of the latter crop having become altogether unimportant. The continued decrease in the cereal crops in the last third of the nineteenth century is attributed to the fall in price of those commodities resulting from foreign competition, together with the superior adaptability of Irish soil for pasturage. Cereal production is carried on in all the provinces, but oats are most important in Ulster, and the raising of barley is largely centred in Leinster. Potatoes still constitute the most important food staple grown in Ireland; the average acreage, however, has fallen off nearly one-third since 1850. The area under crops not mentioned in the table, in 1912, was as follows: rye, 7765 acres; beans, 1421; peas, 279; carrots, 1332; parsnips, 651; cabbage, 37,950; vetches, 2008; rape, 3110; other green crops, 28,383. In 1913 the area under wheat decreased to 34,004 acres; that under potatoes to 582,303 acres; the differences shown by other crops are negligible.

YEAR	Horses	Mules	Asses	Cattle	Sheep	Pigs	Goats	Poultry
1881	534,873	26,392	187,143	3,956,595	3,256,185	1,095,830	266,078	13,972,426
1913	614,482	30,338	243,339	4,932,625	3,620,724	1,060,360	246,348	25,701,342

In 1912 the area under crops, including clover, sainfoin, and grasses for hay amounted to 3,570,676 acres; under permanent pasture, 9,685,358 acres; under small fruit, 15,218 acres; under woods and plantations, 298,735 acres; under bog waste, barren mountain, water, and marsh, 5,761,611 acres.

Stock Raising. The increased importance of stock raising since the middle of the nineteenth century is shown from the fact that the number of cattle per 1000 acres of the total area increased from 143 in 1851 to 230 in 1901, while the number of sheep per 1000 acres increased from 102 to 215, and the number of hogs increased from 52 to 60 during the same period; while in 1913 the proportion per 1000 acres was cattle, 242; sheep, 178; hogs, 52. The large number of cattle is particularly noteworthy, there being in Ireland more head, area for area, than in any other European country. The shorthorned variety predominate. The second table on this page shows the number of the different varieties of domestic animals for 1881 and 1913.

A peculiarity of stock raising in Ireland, especially cattle raising, is that a large proportion of the animals marketed each year are not prepared in Ireland, but are shipped to Great Britain for that purpose. Ireland is Great Britain's greatest single source of foodstuffs. Of meat alone, including animals for slaughter, the exports from Ireland to England are valued at $112,000,000 and form from one-third to one-half of England's total imports in this line. In August, 1914, the fancy prices paid for cattle induced many Irish farmers to sell live stock which should have been kept to replenish the supply next season. Ireland is not excelled in the production of the hunter type of horses, this type being raised mainly in the country south of the Boyne River. Heavy cart horses are raised principally along the eastern seaboard from Wexford to Londonderry. On the western seaboard, especially in Galway and Mayo, ponies are the predominating breed. The raising of horses for general purposes is more widely distributed, with Ulster in the lead. It will be seen from the second table that the rapidly growing poultry industry has attained large proportions. A significant development latterly has been the growth in agricultural coöperation. There was one coöperative society in 1890; in 1908 there were 292 dairy and agricultural societies, with 57 auxiliaries; 168 agricultural societies; 267 coöperative banks; 24 poultry societies; 59 miscellaneous societies; and 4 federations—making a total of 871 societies, having an aggregate membership of 81,710 and an annual trade turnover of £2,476,000. Ulster leads in the movement; Leinster falls furthest behind.

Manufactures. The manufacturing industries are of comparatively little importance. The adverse conditions imposed upon them in former centuries by the British government hampered their development, and the absence of local coal resources and the general nonprosperous condition of the social life of the country have limited its development in recent years. The history of the manufacturing industries, however, is a record of long and desperately continued struggle and is not without its periods of success. In scope the industries have been largely confined to the textiles—wool, linen, and silk. Prior to the time of Charles II manufactures of Irish woolens were well known in many colonial and foreign markets. But the navigation acts in the reigns of Charles I and II cut Ireland off from the British market, while those of William III severed Ireland from all foreign markets. The country could only export woolens to the English markets under heavy duty, thus limiting it practically to the local home market. When the American Colonies revolted, these restrictions were removed. But by this time the industry had secured so great a lead in England that, with the additional advantage given to the latter country through the abundance of coal which now began to supply power for the industry, Ireland was not able to regain its former prominence. The best known of the Irish woolens are the tweeds. They are noted for their durability. In 1907 there were 4461 persons employed in the manufacture of woolen, worsted, and shoddy goods. In 1907 the total production of this industry was valued at £769,000.

The manufacture of linen by the Irish was not at first so detrimental to English interests as was the manufacture of woolens, and it fared much better at the hands of the government. Indeed, for a period, the linen industry became prominent as the woolen industry decreased. The Lord Deputy Strafford and his successor, Ormond, did all within their power to encourage the industry, as did both the Irish and the English parliaments—the latter allowing the products to enter England free of duty. The superior methods of manufacture in vogue in France and the Netherlands were studied, and attempts were made to induce skilled workmen from these countries to migrate to Ireland. With these and other advantages the industry increased, but only at last to excite the ill will of England, which closed its markets to many varieties of the Irish products, and thus seriously hampered the industry, in spite of the generous aid it continued to receive from the Irish government. The wet-spinning process of linen manufacture was introduced between 1825 and 1830, and the factory system grew rapidly. The extreme moisture in the atmosphere gives to Irish linen that delicate whiteness which is unobtainable in any other country. The number of spindles used in its manufacture increased from 396,338 in 1850 to 826,743 in 1879, since which time they have not greatly increased, having been 835,100 in 1900. The power looms, however, increased from 21,177 in 1880 to 32,245 in 1900. In 1907 the linen and hemp industry employed 1505 salaried persons and 70,944 wageworkers, of whom 68 per cent were women. Its products were valued at £13,354,000, distributed as follows: spinning, £5,779,000; weaving, £6,214,000; making-up, £1,361,000.

The manufacturing establishments are almost wholly centred in Ulster. The shirt-manufacturing industry has become very important in Londonderry County. Huguenots immigrating to Ireland after the revocation of the Edict of Nantes introduced the manufacture of silk, and for a time it enjoyed considerable prosperity, but it almost died out before the middle of the nineteenth century. In the early part of the nineteenth century a large number of factories changed from linen to cotton manufacture, and over 100,000 spindles were at one time used in the latter industry. But with the introduction of flax-spinning machinery the manufacture of cotton practically ceased. Owing to the small number of cotton factories, the British census of production does not give separate data on the cotton industry in Ireland.

Shipbuilding is a long-established industry and became especially prominent during the last three or four decades of the nineteenth century. Belfast is the centre of the industry; the principal yard at this place employed more than 10,000 men in 1913 and produced a larger annual tonnage than any other yard in the world. The whole fleet of the White Star Line, including the *Oceanic*, the *Celtic*, and the *Cedric*, were built at this yard. Shipbuilding on a small scale is carried on at Haulbowline and has been recently revived at Londonderry and Dublin. The milling industry is steadily declining. The number of mills decreased from 1482 in 1891 to 1351 in 1901, and their average output also diminished. Importations of flour increased in amount during this time, and importations of wheat decreased. Prior to 1870 there was a thriving leather industry, but machine methods were not adopted, and it has become insignificant.

According to the British census of production for 1907, the principal Irish industries, employing 291,304 persons (except outworkers), produced goods valued at £66,000,000 sterling. The production of the chief groups was as follows: food and drink trades, £27,335,000; textiles (except cotton), £15,836,000; brewing and malting trades, £5,906,000; iron and steel, engineering, and shipbuilding trades, £5,814,000; clothing trades, £5,190,000; public utility services, £2,904,000; spirit distilling, £1,416,000 (brewing and distilling are included in the food and drink trades).

The home industries are still widely spread through Ireland and, in the aggregate, contribute largely to the well-being of the people. Important among these home industries are hand knitting, hand embroidery, and lace making.

The brewing and distilling branches have become the most important of the Irish industries, whether estimated with respect to the number of persons employed or the value of the product. The output of the distilleries increased from 4,801,000 gallons in 1861 to 14,221,520 in 1901, but decreased to 9,723,815 gallons in 1911. It is somewhat less than the output of English distilleries and equals nearly one-half that of

Scotland. The production of beer increased from 1,437,703 barrels in 1861 to 3,762,629 in 1911, the latter figure being somewhat more than one-tenth the total output of the United Kingdom for the same year. Irish beer is remarkable for its purity, being made almost exclusively from malt. The largest part of it consists of porter, which first became the popular drink between 1850 and 1860.

Transportation. The railway system has been constructed, owned, and controlled by private capital. The system is peculiar on account of its large number of small lines, controlled by separate companies, though a tendency towards consolidation has been noticed in recent years. Since 1849 the main lines have had a uniform gauge. The total mileage increased from 1988 in 1871 to 3403 in 1912. The principal lines are the Great Southern and Western, the Midland Great Western, the Great Northern, and the Northern Counties. The number of passengers carried increased from 15,547,934 in 1871 to 22,202,258 in 1891 and 29,162,000 in 1912. The tourist traffic is comparatively large and receives special attention. Ireland has 173 miles of tramways and light railways and 848 miles of canals and canalized rivers, of which 95 miles belong to railways.

Commerce. Irish commerce is mainly with Great Britain and consists of the exportation of raw products and the importation of manufactured articles. The exportation of live stock leads and constantly increases as the pastoral industry grows in importance. Exports of fish are also important. The leading manufactured article exported is linen. Whiskies and beers are also shipped in considerable quantities. The exports to foreign countries and British possessions are quite small. The imports from foreign countries and British possessions, however, are considerable and are rapidly growing in importance. These consist largely of grains—corn and wheat—from the United States and flax and tow from Belgium and Russia. The value of the total imports in 1912 amounted to $355,931,522, and of the exports, $329,104,450. Of the total value of the imports, 36 per cent represented articles of food and drink, 49 per cent manufactured goods, and 15 per cent raw materials. About $107,000,000 worth of farm products were imported. Of the exports, 52 per cent represented articles of food and drink, 41 per cent manufactured goods, and 7 per cent raw materials. The leading imports were: maize, $20,655,455; wheat, $16,060,044; wheat flour, $12,588,637; coal, $14,551,166; cotton goods, $25,685,596; drapery, $23,942,382; raw cotton, $4,857,516; boots and shoes, $8,342,651. The leading exports were: linen goods, $68,158,428; linen yarn, $7,910,793; live stock, $59,987,478; butter, $20,244,504; eggs, $14,242,211; bacon and hams, $20,538,421; ales and liquors, $17,348,151; ships, $16,358,739; cotton goods, $12,969,145. The trade policy of Great Britain applies uniformly to Ireland. Only a few articles like tea, tobacco, sugar, and liquors are subject to import duties. For a discussion of the tariff duties, see *Finance*, under UNITED KINGDOM.

Shipping. The largest part of the trade of Ireland is through the ports of Belfast and Dublin. Belfast leads, both in the amount of foreign and of the total trade. The export trade of Ireland to foreign countries is mainly carried on through Liverpool and Glasgow. In 1912 Ireland owned 897 ocean-going vessels of 401,597 tons net. In the same year there arrived at the ports of Ireland 1716 foreign vessels, with a tonnage of 5,538,740 and 29,936 coasting vessels, with a tonnage of 7,410,829. In the trade between Great Britain and Ireland 26,993 vessels, of 6,964,235 tons, arrived at the ports of Ireland.

Banks. Ireland has nine banks, all of which are joint-stock and six of which are note-issuing. They have all adopted limited liability, except the Bank of Ireland. The authorized issue of notes may be exceeded if specie is held equal to the amount of the excess. The Bank of Ireland manages the public debt of Ireland free of charge. In 1865 the interest on advances to the government was reduced to 3 per cent. In January, 1913, there were also 683 branch banks. The total capital, reserve, and undivided profits of these institutions were £11,643,000, deposits and current accounts, £66,901,000, loans and discounts, £47,161,000. The cash money in hand and at call and short notice was £14,030,000, and the circulation, £7,228,000.

Savings Banks. Trustee savings banks were established early in the nineteenth century, and post-office savings banks in 1861. The greater security afforded by the latter has made them more popular, and deposits in them have become over three times as great as in the former. According to the Savings Bank Act of 1893, the maximum amount which each depositor might deposit in one year was raised from £30 to £50, and the annual maximum amount of stock which might be purchased, £100 to £200; the stock-holding limit was increased from £300 to £500. As a result, the total deposits increased. In 1893 the trustee savings banks contained £1,380,718 deposits; in 1900, £2,035,000; in 1913, £2,652,018. The deposits in the post-office savings banks increased from £663,000 in 1870 to £3,585,000 in 1890 and £13,161,895 in 1913. In 1913 the number of open accounts in the trustee savings banks was 56,867; in the post-office savings banks, 479,873 accounts were active and 199,350 "dormant," the latter being accounts with balances less than £1 and inactive for five years or more.

Coöperative Credit Associations. The want of capital sufficient to secure an improvement of conditions in the poorer rural sections of the west and south of Ireland led to the establishment (1895) of coöperative credit associations upon the Raiffeisen system, through which money is loaned. In 1912 the number of such "banks" was 308, but only 176 were really active; 110 of these held £32,350 of members' deposits. In a report issued on May 20, 1914, a select committee of the Department of Agriculture and Technical Instruction for Ireland recommended the promotion of limited liability societies to take the place of these credit unions.

Government. The chief executive officer for the government of Ireland is the Lord Lieutenant, who is assisted by a Privy Council. He is the personal representative of the crown, and as such occupies a viceregal position, the maintenance of which is his chief function. For this purpose he receives a yearly allowance of £20,000. The actual conduct of the government devolves upon the Chief Secretary for Ireland, who is President of the Irish Local Government Board, a member of the House of Commons, and, when Irish affairs are prominent in the debates, is a member of the cabinet, and as such is chiefly responsible to Parliament for the manner in which the government of the island is administered.

Since the Act of Union (1800) Ireland has been without a parliament of its own, but is represented in the British House of Lords by 28 temporal peers chosen by the whole body of Irish peers, and in the House of Commons by 103 commoners chosen by an electorate substantially the same as that by which English commoners are elected, viz., a household and lodger franchise. (See United Kingdom.) The agitation for Irish Home Rule was finally brought to a successful issue in 1914. Owing to the European War, however, the carrying out of the measure was postponed until September, 1915.

The judicial system of Ireland is modeled upon that of England, and the Irish courts administer English municipal law. The chief judicial tribunal of the island is the Supreme Court of Judicature, which has two divisions—the High Court of Justice and the Court of Appeal. There are also a High Court of Admiralty, a Court of Bankruptcy, and a Land Commissioner's Court. The House of Lords is the final court of appeal from the decisions of the Irish courts. Minor offenses are tried by two justices of the peace.

Local government in Ireland has been revolutionized by the Irish Local Government Act of 1898, which undertook to collect, simplify, and adapt the mass of English and Irish legislation on the subject. Until then the chief county authority was the grand jury. By the Act of 1898 this was replaced by a popularly elected council, chosen for a term of three years. The lower administrative units, boroughs and urban and rural districts, were likewise given elective councils. Affairs formerly attended to by grand juries and presentment sessions, such as relate to poor relief, highways, public health, and local institutions, are now administered by the councils. The larger cities were erected into county boroughs, which are exempt from certain of the provisions of the Local Government Act.

Incorporated boroughs have a mayor, aldermen, and council, while those which are unincorporated are governed by commissioners. The borough councils have charge of such local matters as lighting, watching, sanitation, etc. The local councils are all subject to the supervisory authority of the Local Government Board, consisting of the Chief Secretary, the Undersecretary, and four commissioners. It advises, directs, and controls the action of the councils in many particulars. It approves or rejects the appointment of officials nominated by the councils, fixes salaries, and regulates their term of service. The four commissioners of the board are appointed by the Lord Lieutenant and receive large salaries for their services.

Finance. The Imperial British system of finance is applied to Ireland in practically the same way as it is to the other parts of the kingdom. In the union with Great Britain, Ireland became burdened with a share of the responsibility for a large national debt, which it had had no hand in making. The Irish generally maintain, and many financiers admit, that the burden which the Imperial revenue inflicts upon the country is out of proportion to its wealth, and this claim constitutes one of the most serious grievances of the Irish Nationalists. According to the royal commissioners' report (1896) on the financial relations of Ireland to Great Britain, the taxable capacity of Ireland was only $\frac{1}{20}$ that of Great Britain or less, whereas the revenue collected was about $\frac{1}{11}$ of the amount raised in Great Britain. A comparison of Ireland with England and Wales shows that the per capita receipts from the income tax in the latter is almost four times that in Ireland. Assuming that the income tax returns are a fair test of the relative financial capacities of the two countries, the injustice wrought by the indirect taxes is striking, since the per capita amount of these is only a little less in Ireland than in England and Wales. The proportion of the direct to the indirect taxes in England and Wales is as 56 to 44, whereas in Ireland it is as 31 to 69. The figures given below indicate the great importance of the excise duties. It is this item particularly that seems to be overburdensome.

The following figures give the amount of the Imperial revenue collected in Ireland in the fiscal year ending March 31, 1913: customs, £3,166,000; excise, £3,259,000; estate, etc., duties, £987,000; stamps, £372,000; income tax, £1,484,000; land value duties, £5000; post office, £963,000; telegraphs, £190,000; crownlands, £21,000; miscellaneous, £120,500. The Imperial expenditures in Ireland for the same year were: civil government, £8,816,000; collection of taxes, £299,000; post office, £1,559,000; paid to local taxation accounts, £1,463,000. The taxes on real property are the principal source of local revenue. In the fiscal year 1910–11 the local receipts were as follows: rates, water, gas, and electric light, £4,217,555; tramways and light railways, £218,301; tolls, dues, etc., £422,386; rents, interest, etc., £289,302; government contributions, £1,364,328; loans, £1,788,354; miscellaneous, £476,028. The principal branches of local expenditures for the same year were: town and municipal authorities, for police, sanitary works, etc., £2,957,574; unions and parishes for poor relief, £1,365,383; county, rural, sanitary, and road authorities, £3,640,088; harbor authorities, £529,853; other authorities, £154,494.

Population. Owing to its insularity and its position on the extreme outskirts of Europe, Ireland received only the ebb flow of the great European migrations, and its population is therefore relatively simple in composition. Three major types are usually recognized. The most primitive is a short black-haired, brown-skinned, dolichocephalic race, sometimes called Firbolg in accordance with Irish tradition, which has been variously defined by anthropologists as Neolithic and non-Aryan, or again as Iberian or a branch of the Mediterranean race. The conquerors of this people were a tall and blond race known in Irish traditions as the Tuatha De Danann. It is not known whether the Tuatha De Danann (q.v.) were a Scandinavian or Celtic-speaking people. They were followed by the Gaelic invasion, probably within historic times—a Celtic-speaking race identified with the predominant Irish type of the present day. Stature and cephalic index in Ireland to-day vary little from the characteristic type of England and Scotland, and the Irish people is discriminated from the English and Scotch mainly on grounds of pigmentation (as among the so-called "black Irish"), language, and temperament. Not taking into consideration the different early immigrants, such as the Scandinavians and the Anglo-Normans, which were largely assimilated with the original stock, there are to-day three fairly distinct racial elements represented in

Ireland, a fact which is responsible in a measure for the social and political troubles which have long disturbed the country. By expulsion and by extermination the population had been considerably reduced by the end of Cromwell's reign, when the number was estimated at but a little over half a million. The depopulated districts of east and north Ireland were repeopled by settlers from England and Scotland respectively, and the English became the landowners throughout the other portions of the island. Until after the middle of the eighteenth century the population grew but slowly, being not infrequently checked by the ravages of famine. But towards the end of that century different causes conspired to bring about a rapid increase in the population. Chief of these was probably the universal adoption of the potato as the main staple of food, the plant giving more returns for the amount of area and labor devoted to it than other plants and being well suited to the needs of the people. Connected with this was the increased impetus given to industry in general during the wars with France, and also the decided tendency which developed at this time towards the division of the land into leaseholds, making the acquisition of a holding easy. Under these influences marriages were entered into early and families were large. Whereas, in 1785, estimates place the population at less than 3,000,000, in 1821 the first official census records the population at 6,800,000, and the census of 1841 showed a population of 8,196,000. Considering that the population was almost wholly rural in composition, it was much in excess of that which a healthy economic and social status would permit.

The sequel was precipitated by the potato blight in 1845. This resulted in a large number of deaths from starvation and disease, but its greatest significance was the starting of the tide of emigration which has continued to depopulate the island to the present time. Prior to the Revolution in the American Colonies the Scotch-Irish element of northern Ireland had found its way to the Colonies in large numbers, but not until the time of the famine did the movement affect the Celtic element. It is estimated that in round numbers there were 2,000,000 Irish emigrants between 1840 and 1860, and 1,000,000 in each of the following 20-year periods, most of whom went to the United States. In the aggregate the male emigrants exceed in number the female, though the contrary is true for the Province of Connaught. During the year 1911 the emigrants leaving Ireland numbered 49,280. The births usually exceed the deaths by 27,000 to 29,000 annually. The following table gives the population by provinces for each decade since 1851 and the per cent of increase or decrease of each for the last decade:

POPULATION FROM 1851 TO 1911

PROVINCES	1851	1861	1871	1881	1891	1901	1911	Per cent
Leinster	1,682,000	1,457,000	1,339,000	1,279,000	1,192,000	1,153,000	1,162,000	+0.80
Munster	1,860,000	1,513,000	1,393,000	1,331,000	1,174,000	1,076,000	1,035,000	−3.78
Ulster	2,014,000	1,914,000	1,833,000	1,743,000	1,620,000	1,583,000	1,582,000	−0.07
Connaught	1,012,000	913,000	846,000	822,000	719,000	647,000	611,000	−5.56

In 1911 there were 2,192,048 males and 2,198,171 females, a total of 4,390,219. It will be seen that Munster and Connaught have each declined much more than one-third during the period, and the rate of decrease still continues high in those provinces, while Leinster for the first time shows a slight increase.

The average population per square mile is 135, or less than one-fourth that of England and slightly more than that of the State of Maryland. The loss of population has been in the rural districts, the urban population having held its own. The following table shows the population of cities above 25,000 for 1891, 1901, and 1911:

CITIES	1891	1901	1911
Belfast	255,950	349,180	386,947
Dublin	245,001	290,638	304,802
Cork	75,345	76,122	76,673
Londonderry	33,200	39,892	40,780
Limerick	37,155	38,151	38,578
Rathmines and Rathgar*	27,796	32,602	37,840
Pembroke*	23,992	25,799	29,294
Waterford	20,852	26,769	27,464

* Dublin suburbs.

While the density of population is no longer excessive, even for a country largely agricultural, a large number are scarcely able to secure a livelihood. Certain regions are known as congested districts, and a special board has been created to aid the people and improve conditions. The explanation lies in the fact that the tenants have been evicted from the more fertile regions (see *Agriculture*) and have segregated in the less fertile broken regions, especially in the western Province of Connaught, where the small holding of the peasant does not afford sufficient livelihood for the family, and large numbers are annually obliged to leave their homes during the harvest months and supplement their income by labor in the harvest fields of Scotland and England. The landowning class, or the old aristocracy throughout Ireland, as also the greater part of the well-to-do trading and professional classes, belong to the English element. In Ulster a part of this class belongs to the Scotch element, but a majority of the Scotch are artisans or cotters, whose economic standard of life is somewhat higher than that of the Celtic element, the latter belonging almost entirely to the peasant and the laboring classes. According to the census of 1911, there were 141,134 persons belonging to the professional class, 170,749 to the domestic class, 111,143 to the commercial class, 780,867 to the agricultural class, 613,397 to the industrial class, and 2,572,929, mainly children, to the indefinite and nonproductive class.

The Irish language was almost universally used in the rural districts by the Celtic element until about 1835. Considering the resentment which the Celtic element has always held towards the British, the general change from the Irish to the English language was remarkable for the little opposition that was made to it and the rapidity with which it was accomplished. In

1881, 18.2 per cent of the population could speak Irish; in 1911 only 13.3 per cent (582,446). The percentage is naturally greatest in Connaught and Munster, where the percentages in 1911 were 34.0 and 21.8 respectively (over half of the population of Galway and Mayo were able to speak Irish), while in Ulster the percentage was only 5.8, and in Leinster 3.5. In 1911 only 16,873 persons were reported who spoke Irish only. In very recent years a movement has been started to popularize the Irish language again. In the first decade of the twentieth century the number who were able to speak the Irish language decreased for the country as a whole, though the number increased more than 52 per cent in Leinster and about 4 per cent in Ulster.

Religion. That the religious denominations in Ireland correspond very closely to the different racial elements explains in part the social friction which exists in the country. The Celtic Catholic church resisted from the first the attempts of the English to break its connection with Rome and impose upon it the changes which had accompanied the religious revolt in England. The property of the church, of course, continued in the hands of the church that represented the government. Catholics were placed under serious disabilities, not being allowed to teach school or to act as guardians. Priests were obliged to remain in their own parishes and were excluded from public affairs. Tithes were exacted from Catholics for the support of the Established church. The disabilities were not removed until 1829. The tithes were commuted in 1838. When the political union with England was effected in 1800–01, there was also a union between the established churches of the two countries. The union was dissolved and the Irish church disestablished by an Act of Parliament which went into operation in 1871. The Act provided for the surrender of the property and revenue of the church, with the exception of private endowments. Since then the government of the church of Ireland is in the hands of a General Synod which meets annually. There are also 23 diocesan synods. There are 2 archbishops and 11 bishops.

It will be seen from the accompanying table that more than three-fifths of the Episcopalians are concentrated in the Province of Ulster, and the greater part of the remainder are in Leinster. The Scotch who settled in Ulster were mostly Presbyterians. More recently Methodism has secured a hold among them. Presbyterianism was proscribed during the reign of Queen Anne, but with this exception was generally tolerated by the government, and until the disestablishment of the Episcopal church received a small annual bounty. The largest Presbyterian body has 36 presbyteries and 562 congregations.

The table on this page shows the respective strength of the four leading denominations in the different provinces and the tendency of each for the 50 years from 1861 to 1911. It will be seen that even in Ulster the Catholic church outnumbers any of the others, and in the provinces of Munster and Connaught the non-Catholic elements constitute but a very small fraction of the population. The extreme northeast counties of Londonderry, Down, Armagh, and Antrim have a larger non-Catholic than Catholic population.

The Methodists are the only sect that did not show a decrease during the period, while the percentage of loss was greatest for the Catholics. In the first decade of the century the Catholics lost 2.0 per cent of their membership, the Episcopalians 0.4 per cent, the Presbyterians 0.7 per cent, and the Methodists increased 2.0 per cent. The greater decrease of the Catholic population is due to the fact that the Catholics emigrate in larger numbers than the Protestants. See table under *Population.*

PROVINCES	Year	Catholic	Episcopalian	Presbyterian	Methodist
Leinster....	1861	1,252,500	180,500	12,300	6,290
	1911	990,045	140,182	12,866	8,068
Munster....	1861	1,420,000	80,800	4,000	4,430
	1911	973,805	50,646	4,180	4,175
Ulster......	1861	966,600	391,300	503,800	32,000
	1911	690,816	366,773	421,410	48,816
Connaught..	1861	666,000	40,600	3,068	2,640
	1911	588,004	19,010	2,069	1,328
Total.....	1861	4,305,100	693,200	523,188	45,360
	1911	3,242,670	576,611	440,525	62,382

Education. In the establishment of an educational system in Ireland, as in many other countries, religion has been a seriously disturbing factor. Such educational advantages as were offered the Irish children by the government were thoroughly dominated by the idea of making them Protestants and essentially British, and consequently these advantages were shunned by all Catholics. At the same time laws passed in the reigns of William III and Queen Anne made it a penal offense for Catholics to teach or to send their children abroad to be educated. Catholic teaching, however, was carried on in violation of the law, such schools being known as hedge schools. A great deal of money from both private and government sources was expended on education during the eighteenth century and the early part of the nineteenth, most of it being expended through the proselyting societies. The Charter schools, founded in 1733, and the Association for the Prevention of Vice, founded in 1800, received government grants, while the London Hibernian Society, founded in 1805, and the Baptist Society, established in 1814, were supported mainly from subscriptions. The Erasmus Smith schools, dating from 1657, were endowed. A Catholic congregation—the Christian Brothers—was founded in 1802 for the purpose of teaching, and later attained considerable importance. In 1811 the Kildare Place Society was founded and after 1814 received government subsidies. This society introduced the policy of limiting religious instruction to Bible reading.

In 1819 the government began to make grants to schools established by voluntary subscriptions without regard to religion. In 1831–34 the so-called national system of education was established. Under this system secular instruction was given to children assembled together without distinction of creed, but it was provided that they should be separated for purposes of religious instruction, which should be given by the pastors of the respective local churches. At first the Catholics took kindly to the system, the Episcopalians and Presbyterians being opposed to it. However, concessions were made to the Protestants, and a proselyting spirit was allowed to creep into the secular teaching. The Catholics were unable to prevent this, owing to their small representation on the board of commissioners in charge; while the church condemned it, demanding (1850) separate education and forbidding Catholic children from attending Protestant instruction. In 1861 the Catholic membership upon the board was made equal to the Protestant. At present the system is divided for the most part along denominational lines. The children of the different religious faiths generally go to schools taught by teachers of their own faith. No child is allowed to attend a religious exercise of a denomination other than his own except upon the written request of the parent.

The Irish educational system differs radically from the English, in that the former is so completely under the control of the central administration. The regulating of teachers' salaries, determining the course of instructions, furnishing schools with supplies, including books, and even the erecting of a certain class of buildings, are all matters in the hands of the central board. The provision of textbooks by the state follows from its policy of not allowing religious questions to be raised in secular teaching and from the desire to prevent the fostering of sentiments out of harmony with Imperial unity. The omission of Irish patriotic songs and of Irish history naturally subjects the administration to much criticism. The supervision of the system is secured by dividing the country into districts and assigning an inspector and corps of subinspectors to each division.

Since 1892 there has been a compulsory school law, the compulsory period being from 6 to 14. The law is, however, not well enforced. Illiteracy is decreasing throughout the country, the percentage of persons five years and over who could neither read nor write having decreased from 25.2 in 1881 to 18.4 in 1891, to 13.7 in 1901, and to 9.2 in 1911. Illiteracy is much the most prevalent in Connaught, where in the last year it amounted to 15.2 per cent. The percentage among the Catholics was over twice as great as for any of the Protestant sects. In December, 1912, there was a total of 8255 elementary schools, of which 4397 were Roman Catholic, with 373,154 pupils; 1549 Protestant, with 117,985 pupils; and 2303 mixed, with 177,519 pupils. In that year 74.6 per cent of the enrollment was in average attendance. No special provision is made by the government for secondary schools other than certain grants in aid which are distributed without regard to the auspices under which they are conducted, according to the "payment in result" system. There are seven training schools for teachers, all of which are aided by the government; their attendance in 1912–13 was 1160.

About 94 per cent of the annual expenditure for schools is borne by the state. The system of apportioning the state grant to elementary instruction according to the results of an examination given the pupils was abandoned, and now the grant is based upon average attendance, with the teacher's salary additional, the salary being fixed according to the one of the three grades in which he teaches, though it may be raised within any given grade for "continued good service."

The principal higher institution of instruction is the University of Trinity College, Dublin, which had an enrollment in 1913–14 of 1285 students. The Catholic population have refused to patronize this institution and have sought in vain to secure state maintenance for a Catholic university. The University College in St. Stephen's Green, Dublin, is under the direction of the Jesuits. There is a National University which only exercises, in the main, examining functions, and a large number of Catholics receive degrees from this institution. Of the three Queen's colleges, at Belfast, Cork, and Galway respectively, only the first is of true university rank. The Presbyterians maintain the McGee College at Londonderry. There are also a number of technical and theological institutions. Alexandra College is for the education of women, and members of that sex are admitted also to the Queen's colleges.

Charities. The poor-law system is similar to that described under UNITED KINGDOM for England and Wales. The adult able-bodied indoor paupers in 1913 numbered 4312, and all other indoor paupers numbered 32,705. The outdoor paupers for the same year numbered 40,129, and the number of inmates of asylums was 1653. Much was done during the last decade of the nineteenth century to improve the conditions of the districts which had long suffered from poverty. A Law of 1821 declared that, when the population of an electoral division exceeded a certain ratio to the ratable value of its property, it should be known as a congested districts county. These districts are wholly in west Ireland—principally in Connaught and in the counties of Donegal and Kerry. A Congested Districts Board was established, and means were made accessible for this board's use in the betterment of conditions in these districts. The system of cultivation practiced in them was found to be most deplorable, and it was generally necessary for the occupants of the holdings to have a secondary source of income, as, e.g., harvest migrations to Scotland and England, as already mentioned. Agricultural inspectors were employed by the board, and much has been done towards improving the soil and the methods of cultivation. Sometimes families are removed to more favorable localities, and not infrequently a number of small holdings are amalgamated into one sufficiently large to maintain a family. The board has done much also to aid in the development of the coast fisheries. The board has powers almost indefinitely wide to aid distressed regions in any manner, and the funds annually at its disposal are about £245,500.

History. According to native legends Ireland was inhabited first by various tribes, of which the most important were Nemedians, Fomorians, Firbolgs, and Tuatha De Danann, who were eventually subdued by Milesians or Scots. Although Ireland is mentioned under the name of Ierne in a Greek poem five centuries before Christ, and by the names of Hibernia and Juverna in various Roman writers, little is known with certainty of its inhabitants before the fourth century after Christ, when, under the appellation of Scoti, they became formidable by their descents upon the Roman Province of Britain. These expeditions were continued, and extended to the coasts of Gaul, till the time of Lavgaire, or Loigaire, MacNeill (c.430), in whose reign St. Patrick (q.v.) attempted the conversion of the natives. Although Christianity had been previously introduced in some parts of Ireland, Patrick encountered great obstacles, and the new faith was not fully established in the island till about a century after his death.

From the earliest period each province of Ireland appears to have had its own king; according to legend these kings were subject to the *ard-ri*, or monarch, to whom the central district, called Meath, was allotted, and who usually resided at Tara. Each clan was governed by a chief selected from its most important family. The laws were dispensed by professional jurists styled *brehons*, who received great consideration and were endowed with lands and important privileges.

In the sixth century extensive monasteries were founded in Ireland, in which religion and learning were zealously cultivated. From these establishments numerous missionaries went forth during the succeeding centuries, while many students of distinction from England and the Continent visited Ireland and received instruction at this period. The progress of Irish civilization was checked by the incursions of the Scandinavians, begun towards the close of the eighth century, and continued for upward of 200 years. Establishing themselves in towns on the east coast of Ireland, with the assistance of friendly native tribes, they continued to make expeditions into the interior until their signal overthrow at the battle of Clontarf, near Dublin, in 1014, by Brian, surnamed Boroimhe.

The first step towards an Anglo-Norman conquest of Ireland was made by Henry II, who is said to have obtained in 1155 a bull from Pope Hadrian IV authorizing him to take possession of the island, on condition of paying to the papal treasury a stipulated annual revenue. This bull is probably a forgery. At all events, nothing was done until Dermod Macmurrough (q.v.), the deposed King of Leinster, sought refuge at his court and obtained permission to enlist the services of English subjects for the recovery of his kingdom. Dermod, returning to Ireland in 1169, with the aid of his foreign mercenaries and still more numerous Irish allies, succeeded in recovering part of his former territories and in capturing Dublin and other towns on the east coast. After his death the succession to the Kingdom of Leinster was claimed by his son-in-law, Richard, Earl of Pembroke, surnamed Strongbow. In 1172 King Henry, with a formidable armament, visited Ireland, received homage from several minor native chiefs and from the principal Norman leaders, and granted to the latter charters authorizing them, as his subjects, to take possession of portions of the island, in virtue of the grant made to him by the Pope. The chief Anglo-Norman adventurers, "Strongbow," De Cogan, De Lacy, Fitzgerald, Fitzstephen, Fitzmaurice, and De Courcy, encountered formidable opposition before they succeeded in establishing themselves on the lands which they thus claimed. The government was intrusted to a viceroy, and the Norman legal system was introduced into such parts of the island as were reduced to obedience to England. The youthful Prince John was sent by King Henry into Ireland in 1185, but the injudicious conduct of his council excited disturbances, and he was soon recalled to England. John made a second expedition into Ireland in 1210, to curb the refractory spirit of his barons, who had become formidable through their alliance with the natives. During the thirteenth century the principal Anglo-Norman adventurers succeeded in establishing themselves, with the feudal institutions of their nation, in some parts of Ireland, by the assistance or suppression of native clans. The Fitzgeralds, or Geraldines, acquired almost unbounded power in Kildare and East Munster, or Desmond; the Le Botillers, or Butlers, in Ormond, or West Munster; and the De Burghs, or Burkes, in Connaught. After the battle of Bannockburn, in 1315, Edward Bruce invaded Ireland and attempted to overthrow the English power there. The Pope, at the instigation of England, excommunicated Bruce with his Irish allies; but although his enterprise failed of success, the general result was a decline of the English dominion in Ireland. The descendants of the most powerful settlers gradually became identified with the natives, whose language, habits, and laws they adopted to so great an extent that the Anglo-Irish Parliament passed, in 1366, the Statute of Kilkenny, decreeing excommunication and heavy penalties against all those who followed the customs of, or allied themselves with, the native Irish. This statute, however, remained inoperative; and although Richard II, later in the fourteenth century, made expeditions into Ireland with large forces, he failed to effect any practical result, and the power and influence of the natives increased so much at the time of the War of the Roses that the authority of the English crown became limited to a few towns on the coast and the district termed the Pale (see ENGLISH PALE), comprising a small circuit about Dublin and Drogheda. In the struggle between the houses of York and Lancaster, Ireland supported the house of York.

The participation of the Anglo-Norman nobility of the Pale in the War of the Roses greatly crippled the English interest. When he came to the throne, Henry VII left Gerald, Earl of Kildare, Viceroy of Ireland, although the Earl belonged to the Yorkist party. The assistance rendered by the Earl to the Yorkist pretenders finally compelled the King, in 1494, to remove him and to send over Edward Poynings to restore order to the Pale. Poynings represented the purely English interest, as distinct from the Anglo-Norman interest, which up to that time had prevailed in Ireland. He at once summoned the Parliament of Drogheda, which enacted most important legislation, providing for the defense of the Pale, reducing the power of the Anglo-Irish lords, and rendering the Parliament and judiciary of Ireland dependent on the English crown. The nobility was forbidden to oppress the inferior baronage, to make exactions upon the tenantry, or to assemble their armed retainers; their influence on the towns was diminished. The Statute of Kilkenny, which compelled the English and Irish to live apart and forbade Irish law and customs in the Pale, was confirmed. All state offices, including the judgeships, were filled by the King, instead of the viceroys, and the entire English law was to hold for the Pale. Most important of all was the so-called Poynings Law, which made the Irish Parliament dependent upon the King. It provided that all proposed legislation should first be announced to the King and meet with his approval, after which he should issue the license to hold Parliament.

Henry VII reëstablished the Earl of Kildare, who was the most powerful of the Irish nobility, as Viceroy, and under his rule the Pale grew and prospered. His family, the famous Geraldines, rebelled and were overthrown during the reign of Henry VIII. Henry VIII, in 1537, attempted to introduce the Reformation into Ireland, and the dissolution of the monasteries was begun. Somewhat later, relics and images were destroyed and the dissolution was completed. The native chieftains were conciliated by a share of the spoils and received English titles, their lands being regranted under English tenure. It was Henry's policy thus to conciliate them and to leave the Irish under their own laws. An English commission held courts all over the island, but Irish right was respected, and the country remained peaceful. This result came about under the wise rule of St. Leger, who was Viceroy during the latter part of the reign. In the Parliament of 1541, attended for the first time by native chieftains as well as the lords of the Pale, Henry's title of Lord of Ireland, which had been conferred by the Pope, was changed into that of King.

The religious changes under Edward VI and Mary had little effect upon Ireland. Although Mary was herself a Catholic, she was the first to begin the colonization of Ireland by English settlers. The Irish people of King's and Queen's County were driven out and their lands given to English colonists. Elizabeth at first followed her father's policy of conciliating the Irish chieftains, but the rebellion of Shayne O'Neill, an Ulster chief, caused a radical change in her policy. An act was passed making all Ireland shireland, and the commissioners of justice were invested with military powers. So far from respecting Irish right, they ignored it altogether. The religious wars of Elizabeth were attended by rebellions of the Irish Catholics. The Earl of Desmond, a representative of the great house of Geraldine, which ruled over the greater part of Munster, was defeated after a long struggle. Hugh O'Neill, called by the English the Earl of Tyrone, annihilated an English army on the Blackwater and baffled the Earl of Essex, whom Elizabeth had sent against him. A Spanish force coming to his assistance made the mistake of landing in the south, instead of in the north, as had been promised, which led O'Neill to make a march of 200 miles through desolate country in order to join them. His forces were too weak to withstand the English in the field, and about the beginning of 1603 he submitted to Lord Mountjoy, but was allowed to retain his earldom. During all these wars the greatest cruelty and treachery were practiced on both sides. In order to destroy Irish resistance, the English devastated the villages, crops, and cattle, putting to death all the inhabitants they could secure. The greater part of Munster and Ulster was laid desolate, and many more perished from hunger than by the sword.

Under Elizabeth and James I the Anglican state church was extended over Ireland, not only obtaining all that belonged to the church of the Pale, but being invested with the establishment belonging to the Celtic church as well. There was an ancient feud between these two Irish churches, and they were intensely hostile to each other. The church of the Pale was effected by the Reformation, but the Celtic church became increasingly Roman. The entire Celtic population of Ireland, and the majority of the inhabitants of the Pale, remained Catholic. The Anglican church thus became a mere instrument in the hands of the English rulers in Dublin Castle.

During the reign of James I the English system was introduced into Ireland on a grand scale. English law was pronounced the sole law of the land. The fight of Tyrone and Tyrconnell gave a pretext for the confiscation of the land in six counties of Ulster. The independence of the Irish Parliament was destroyed by the creation of 40 boroughs out of small hamlets, which secured a permanent majority to the crown.

The despotism of the Earl of Strafford, the Viceroy of Charles I, produced order and prosperity in Ireland. By balancing the number of Catholics and Protestants in Parliament and holding out to the former the promise of toleration, he succeeded in obtaining liberal supplies for the King in his conflict with the English Parliament. The native Irish, who had been dispossessed by the plantations in Ulster and elsewhere, made use of the English situation to regain their possessions. Under the leadership of Rory O'More, a conspiracy was formed in 1641 to seize Dublin and expel the English. They succeeded in driving the English settlers out of Ulster and committed many outrages, not, however, so many as has been supposed. It has been estimated by English writers that at least 30,000 people were put to death, but this number is certainly exaggerated. The Scotch were, as a rule, spared. The insurgents were soon joined by the Catholic lords of the Pale, and together they chose a Supreme Council to govern Ireland. Charles I sent over the Earl of Glamorgan to treat with them, and the Earl went so far as to promise them the predominancy of the Catholic church in Ireland as the price of their assistance to the King. But the struggle in England was terminated in favor of the Parliament before the Irish Catholics could render effective assistance to the King. In 1647 the alliance between the lords of the Pale, who desired nothing beyond toleration for their religion, and the Celts, who hoped for the restoration of the ancient land system, came to an end. In 1648 the Earl of Ormond returned as the Viceroy of Charles I and made an alliance with the Catholic lords, thus securing Ireland to the Royalist party. In 1649 Cromwell landed at Dublin, which the Catholics had been unable to take. With his well-disciplined army, 10,000 men of the New Model, he stormed Drogheda and put its garrison of 2000 to the sword. At Wexford there was another slaughter. Cromwell's successors, Ireton and Ludlow, finished the war, and a great part of the best lands of Munster, Leinster, and Ulster was confiscated and divided among the soldiers of the Parliamentary army. The Catholics and Loyalist landowners were banished to Connaught. A portion of the land confiscated at this time was restored under Charles II, but at least two-thirds of the land in Ireland remained in the hands of the Protestants. The viceroyalty of Ormond did much to restore order and promote industry, but the Protestant ascendancy was maintained. James II, however, reversed this policy. Under his Viceroy, the Earl of Tyrconnell, Catholics were advanced to positions of state and placed in control of the militia, which Ormond had previously organized. Consequently the entire Catholic population took sides with James II in the English revolution of 1688, and when in 1689 James landed at Dublin with his French officers, Tyrconnell had an Irish army ready to assist him. The Protestant settlers were driven from their homes and found refuge in Enniskillen and Londonderry. James attempted to capture Londonderry, but he was hampered by the lack of artillery, and the city was relieved by way of the sea. His Parliament of 1689 restored all the lands that had been confiscated since 1641 and passed an act of attainder against the partisans of William III. In the following year William landed in Ireland and in the battle of the Boyne (July, 1690) defeated the Irish forces. He failed, however, to capture Limerick, which was bravely defended. A brilliant sally of the Irish patriot Sarsfield destroyed William's heavy artillery, and he was forced to retire. The next year his generals defeated the Irish army at Aughrim, and Limerick was forced to capitulate. By the terms of the Treaty of Limerick, Catholics were permitted a certain amount of religious freedom, and the lands they had possessed under Charles II were to be restored.

The Parliament of England forced William to break the concession of the Treaty of Limerick regarding the restoration of the lands, and the Parliament of Ireland violated the terms granting religious toleration by enacting the penal laws, directed mainly against the Roman Catholics. The peasants were annoyed by cruel and vexatious restrictions alike on their religious worship and innocent amusements. Irish commerce and industries were deliberately crushed. In 1663, and again in 1696, all Irish trade with the English colonies was prohibited, and in 1665 and 1680 the Irish import trade to England in cattle, milk, butter, and cheese was forbidden. The trade in woolens, which had grown up among the Irish Protestants, was likewise crushed by an enactment of 1699, which prohibited the export of woolen goods from Ireland to any country whatever. Small amends for these injuries were made by leaving the linen trade undisturbed. The result of all these measures was the gradual decline of Ireland. A large percentage of the best elements of the population emigrated—the Catholics to serve in the armies of Spain and France, the Protestants to carry their industries to America.

The American Revolution awakened much sympathy in Ulster, especially among the Presbyterians, who, being disqualified from holding office, desired a general emancipation, including the Catholics. In 1778 the Irish Parliament passed the Relief Act, removing some of the most oppressive disabilities. Meanwhile the Irish Protestants, under pretext of defending the country from the French, who had formed an alliance with the Americans, had formed associations of volunteers, 80,000 strong. Backed by this military force they, under the lead of Grattan, demanded legislative independence for Ireland, and on motion of the younger Fox the British Parliament repealed both the Poynings Law and much of the anti-Catholic legislation. But the Irish Parliament was composed entirely of the Protestants of the Established church, who were unwilling to extend the suffrage, and it was even more corrupt and in need of reform than the British Parliament. The principles of the French Revolution found their most powerful expression in Ireland in the Society of United Irishmen, which organized the rebellion of 1798. The peasantry rose in Wexford and, although miserably armed, made a brave fight. At one time Dublin was in danger, but the insurgents were defeated by the regular forces at Vinegar Hill. A French force of 1100 landed in Killala Bay, but too late to render effective assistance. Pitt, the British Prime Minister, thought a legislative union of the two countries, together with Catholic emancipation, the only remedy for Catholic rebellion and Protestant tyranny. By a lavish use of money and distribution of patronage, he accordingly induced the Irish Parliament to pass the Act of Union. On Jan. 1, 1801, the Union was formally proclaimed.

The history of Ireland since the Union is the story of a continuous struggle for civic and religious freedom and for separation from Great Britain. Hardly had the Union been carried out when the universal dissatisfaction gave rise to the outbreak of July 23, 1803, under Robert Emmet (q.v.). It was easily suppressed, and for some time there were no further armed revolts. Instead a conflict was carried on along parliamentary lines under the leadership of Daniel O'Connell (q.v.). In 1823 he founded the Catholic Association, which demanded first of all Catholic emancipation. This was finally obtained, for in 1828 Catholics were permitted to hold office, and in 1829 they were allowed to sit in Parliament. The struggle now turned upon the tithes, which all, Catholics included, were compelled to pay for the maintenance of the Anglican church in Ireland. Great cruelties were perpetrated on both sides during the so-called Tithe War, which was coupled with a renewed emphatic demand for the repeal of the Act of Union. O'Connell formed various societies to carry on the agitation, and there was considerable lawlessness, which was fostered by the so-called Ribbon Society. See RIBBONISM.

The reform of Parliament in 1832 aided the Irish leaders, for it increased the number of Irish members from 100 to 105 and, more important still, it gave the middle class more power, in place of the pro-English aristocracy. In 1838 a bill was passed converting the tithes into rent charge, to be paid by the landlords, and agitation in connection with the church ceased to be acute for a time. O'Connell had for a long period been supported by the more extreme of the Irish Nationalists, but in 1843 it became evident that he would never make an appeal to arms. The consequence was the formation of the Young Ireland party, whose leaders were all young men, the most notable being William Smith O'Brien, John Blake Dillon, Thomas Francis Meagher, and John Mitchel. The last named in turn seceded from the Young Ireland party and advocated an Irish republic. For a while Peel, the English Prime Minister, tried concessions, but in vain, the more so as from 1845 to 1847 rent-racked Ireland suffered from a terrible famine, due to the failure of the potato crop. Vast numbers emigrated, especially to America, whither they carried with them the hatred towards England and continued to give effective support to the Irish cause. Many also died, and it is said that in all one and a half million of people had disappeared by 1848. In the latter year the Young Ireland party sought to bring about a revolt, but the whole attempt proved a miserable failure; the leaders were captured and transported.

The work of the Young Ireland party was in time taken up by the Fenian Society (q.v.), which accomplished nothing, except arousing English feeling by various outrages, and thus giving rise to several coercive measures. Far-reaching reforms, however, came about through the efforts of Gladstone. On July 26, 1869, a measure was passed by Parliament which finally disestablished the Irish church, the Act taking effect on Jan. 1, 1871. (See IRELAND, CHURCH OF.) Many reforms in the land laws were also carried out, which are described in detail under

Irish Land Laws; while the agrarian agitation is treated under Land League. Ireland, however, was not content with ecclesiastical and agrarian reforms, and Home Rule (q.v.) became the all-absorbing question, the cause finding a champion of great ability in Charles Stewart Parnell (q.v.). In 1880 the agrarian movement in Ireland developed into a system of organized terrorism. As a result of this lawlessness a bill became law on March 2, 1881, known as the Coercion Act, which gave the Lord Lieutenant of Ireland power, by warrant, to arrest any person, on mere suspicion, for treason, intimidation, and the like. Under this law Parnell and other Irish leaders were arrested, but, as usual, the Irish retaliated with outrages, which culminated in the murder of the Chief Secretary for Ireland, Lord Frederick Cavendish, and the permanent Undersecretary, Thomas H. Burke, in Phœnix Park, Dublin, on May 6, 1882. Thereupon the government passed an exceptionally stringent and severe Crimes Act, which, among other things, permitted the examination of witnesses without bringing any specific charges against individuals. By this means a body, known as the Invincibles (q.v.), was discovered, under whose auspices most of the outrages had been perpetrated.

The parliamentary election of 1886 gave Mr. Gladstone a very small majority in the House of Commons and made him dependent on the Irish Nationalists for their support. On April 8 he brought in his first Home Rule Bill, followed a few days later by a Land Purchase Bill—the latter a sop to the Irish landlord. Deserted by a large section of his following who did not believe in the policy of Home Rule, the bill was lost by about 30 votes, and Parliament was dissolved. In the July elections the Conservatives and Liberal-Unionists outnumbered the Gladstonians and Parnellites by 100, and Lord Salisbury was again Prime Minister. In the same year Mr. Parnell introduced a bill by which leaseholders might partake of the benefits of the Land Act of 1881 (see Irish Land Laws); it also provided for a revision of the judicial rents necessitated by the fall in agricultural prices. The rejection of this bill was answered by the Plan of Campaign drawn up by Messrs. Dillon, O'Brien, and Healy. Briefly the plan was this: the tenant was to offer a fair rent, and if the landlord refused the offer, the money was paid to trustees for the purpose of resisting evictions. Mr. Parnell did not approve of the plan. Mr. Gladstone, however, would not condemn it, holding it to be the consequence of the ministerial policy. As a result of the Plan of Campaign, Mr. Arthur Balfour on his appointment as Chief Secretary in March, 1887, succeeded in placing on the statute book the Perpetual Crimes Act, which substituted trial by magistrates for trial by jury in cases of certain acts of violence. But the plan also forced the government to pass Mr. Parnell's Land Measure, which it had rejected in 1886.

Prominent Liberals visiting Ireland at this time were greeted with much popular enthusiasm. On the other hand Irish members were eagerly welcomed on Liberal platforms in Great Britain. Not relishing the turn things were taking, the London *Times*, the chief opponent of Home Rule in the English press, published a series of articles on "Parnellism and Crime," based on a series of documents received from the Secretary of the Irish Loyal and Patriotic Union. These documents connected Parnell and many of his following with the agrarian crimes in Ireland and showed that Mr. Parnell himself condoned the Phœnix Park outrages. Parliament appointed a special commission of investigation, which continued in office for 13 months. This commission discovered that the chief documents were forgeries, executed by a disreputable and destitute Irishman named Richard Pigott, well known in Dublin. After confessing his crime, Pigott fled to Madrid and committed suicide. The special commission issued its report in 1890, and it seemed to be a turning point in the history of Ireland. Mr. Parnell became a hero with the English Liberals. The by-elections were beginning to go against the government, their majority was diminished, and hopes for Home Rule were very bright indeed when, on Nov. 17, 1890, Captain O'Shea filed a petition for divorce from his wife and named Mr. Parnell as corespondent. There was no defense and the decree was granted. The day after the judgment the members of the National League, with Mr. Redmond in the chair, passed a vote of confidence in Mr. Parnell. Mr. Gladstone expected that the Irish leader would retire for a time at least, but finding that he did not, sent a letter to Mr. Morley virtually demanding that he do so, and intimated that his continued leadership would mean the defeat of Home Rule. The Irish party was not prepared to make such a sacrifice for their leader, and Parnell was deposed by a vote of 45 to 26. The majority elected Mr. Justin McCarthy as their chairman. Mr. Parnell made a dogged resistance, attending meetings and making speeches week after week, but the strain upon his health was too great. He died at Brighton, Oct. 6, 1891. Party spirit among the Nationalists ran riot.

While the Irish members were disputing about the leadership, Mr. Balfour profited by the opportunity to silence his Liberal critics. In the autumn of 1890 he made a tour of Ireland. He found great destitution in many places, owing to the failure of the potato crop; this he remedied by a relief fund plus a small grant from the Exchequer. His Light Railways Act of 1890 opened up some of the poorest parts of the west and gave employment to some 14,000 men. The Ashbourne Acts were extended and modified by the Land Purchase Act of 1891, by which £30,000,000 were provided on security to convert the tenants of the Irish estates into proprietors. In the same year the Congested Districts Board was established. In February, 1893, the Liberals being in power, Mr. Gladstone introduced his second Home Rule Bill. It occupied the House of Commons 82 days; the third reading was carried on September 1 by a majority of 34. It was thrown out by the Lords by a vote of 419 to 41, and the public, rather tired of the Home Rule discussion, acquiesced in their decision. Early in the following year Mr. Gladstone retired. An Amending Land Act was added to the statute books in 1896. Two years later a Local Government Act, which the Unionists had made part of their programme, transferred the government of the counties and rural districts, except in some of the northern counties, from nonrepresentative grand juries to popularly elected county councils. This was not a substitute for Home Rule, nor was it intended to be. Most important was the passing in 1899 of an Act "for establishing a Department of Agriculture and other Industries and Technical Instruction in Ireland and for other purposes connected therewith."

In 1900 patriotism triumphed over party strife, the two factions in the Irish Nationalist party were reconciled, and Mr. Redmond, the leader of the Parnellites, was elected chairman of the United Irish party. In a speech at Liverpool in 1902 Lord Rosebery sounded what he thought was the death knell of Home Rule. A few days later Sir Henry Campbell-Bannerman, in a speech, took the supposedly buried issue under his protection, and Home Rule became one of the responsibilities of the Liberal party. Mr. Wyndham's Land Purchase Act of 1903 was founded on a report of a conference held between the representatives of the landlord and tenant, in Dublin, and £100,000,000 were provided for the buying out of the entire landlord class. Mr. Wyndham's policy of "devolution," i.e., the delegation to local bodies of larger powers, found little or no support among the Nationalists, and the Irish Unionists bitterly attacked it as a sop to Home Rule. In 1905 the Sinn Fein (Gaelic for "Ourselves Alone") was organized by the radicals in Ireland. Their aim was to regenerate the nation, not merely politically, but also linguistically, educationally, industrially, and socially. The General Elections of 1906 were disastrous to the Unionists. A Liberal government was in, with the largest majority ever attained since 1832. To the Nationalists, as the fruits of a generation of parliamentary agitation, Mr. Birrell in 1907 submitted the mild Irish Councils Bill. It was strongly opposed by the Sinn Fein and the Roman Catholic clergy. To the surprise of the Liberal party it was rejected with scorn at an Irish national convention at Dublin. Towards the end of the session an Evicted Tenants Bill was passed, by which the estates commissioners were empowered to force the sale of land by "compulsion." Owing to the inadequacy of the financial provisions of the Land Act of 1903, an Amended Land Purchase Act was passed in November, 1909, and £52,000,000 were granted for pending agreements and practically an unlimited amount for the future. (See IRISH LAND LAWS.) On Oct. 1, 1909, the two universities created by Mr. Birrell's Irish Universities Act of 1908 came into existence: the Queen's University with the Queen's College at Belfast, and the National University at Dublin with the Queen's colleges at Cork and Galway and a new college at Dublin. Each college in reality became an almost independent university. The governing bodies of these colleges are to a large extent Catholic and Irish. Religious services of any kind are prohibited within their precincts and there are no religious tests. Trinity College in Dublin remained untouched. This was the solution of the problem which Mr. Gladstone had vainly attempted to solve in 1873.

In 1911 the Nationalists, holding the balance of power in the House of Commons, insisted that Home Rule should have precedence over all other measures. In October Mr. Birrell, explaining the government's Home Rule Bill, declared that it involved a bicameral Irish Parliament, with an executive responsible to it, and with full representative powers and control over purely Irish concerns. The Ulster Unionists appointed a commission to draw up a plan of a provisional government for Ulster, which should come into operation if a Home Rule measure passed. On April 11, 1912, Mr. Asquith introduced the Government of Ireland Bill, as it was officially called. It provided for an Irish Parliament consisting of a Senate and a House of Commons, which was empowered to make laws for Ireland, but certain classes of legislation were removed from its jurisdiction, including powers regarding peace, war, treaties, army, navy, trade, navigation, coast defenses, coinage, stamps, weights, measures, copyright, religion, and Freemasonry. Besides the veto prerogative of the Lord Lieutenant and the Imperial Executive, the British Parliament retains authority over all Irish legislation. The financial provisions were regarded as the chief difficulty. The first reading was carried in the House of Commons on April 16 and the second reading on May 9. While in the committee stage it was so amended as to allow, after the first five years, proportional representation, by provinces, in the Senate. On Jan. 1, 1913, Sir Edward Carson, leader of the Ulster Unionists, proposed an amendment to exclude Ulster from Home Rule, notwithstanding the fact that in the Province of Ulster Roman Catholics constitute about 40 per cent of the population. The amendment was rejected by a vote of 294 to 197, and on Jan. 16 the bill passed its third reading in the Commons. It was rejected by the House of Lords on January 30. The bill was reintroduced in the summer session, but on July 15 the Lords refused it a second reading and declined to proceed with a consideration of the bill until it had been submitted to the will of the country. It passed the third reading, for the second time, in the House of Commons on July 17. The Ulster Volunteers' preparation for armed resistance to any measure of Home Rule went on apace, and the English Conservatives, the avowed guardians of law and order, condoned and openly supported the revolutionary propaganda of the Ulster Unionists.

During the year the Cunard and White Star lines, claiming that Queenstown harbor was unsafe for their vessels, refused to allow them to call at that port, thereby delaying the American mail at least 24 hours. The government supported the companies in their breach of contract, and the Irish charged that the government was antagonistic to Ireland's commercial prosperity. The year 1913 was remarkable also for the great strike of the Dublin transport workers, fomented by James Larkin. The first strike was on the tramway system during Horse Show week; then it quickly spread to every class of transportation, crippling trade and closing the port of Dublin for a time. Twenty thousand men were out of work, and the suffering in the strikers' families was so intense that the English Socialists offered to take the children to England and care for them. This plan, which aroused much hostile feeling, was frustrated by the Roman Catholic clergy of Dublin. Sir George Askwith, chairman of a commission of inquiry, appointed by the British Board of Trade, declared the strike disastrous to all concerned and asked for a mutual agreement. The employers refused to recognize the Transport Union till that body repudiated the syndicalist principles with which Larkin had imbued it. Larkin was tried and sentenced to seven months' imprisonment for inciting to destruction of property, physical assaults, and seditious libel. The Labor element accused the government of injustice in imprisoning Larkin while they left Sir Edward Carson free to organize and utter treason. After the arrest of the leader the strike was broken, and the men gradually returned to work. Larkin was released about the middle of November, owing possibly to the government's loss of the Labor vote in certain of the English constituencies.

Parliament reassembled on Feb. 10, 1914, with every prospect for a stormy session. Sir Edward Carson threatened civil war unless Ulster was excluded from control of the Home Rule Parliament. Mr. Asquith proposed to allow the various counties in Ulster to decide for themselves whether they wished to be under the jurisdiction of the Dublin Parliament or not. Those who decided in the negative were to be excluded for six years and then be automatically included, unless the Imperial Parliament decided otherwise. This was vigorously opposed by the Irish leaders and the Nationalist papers on the ground that it would partition Ireland. At the second reading in April the majority fell from 98 to 80, as the followers of Mr. O'Brien deemed it ridiculous to vote on a measure which was not intended to pass. Seeing that Mr. Asquith was willing to make further concessions to Ulster, the leaders of the Irish party answered by extending their patronage to the National Volunteer movement, which they had discountenanced up to this time. The as yet unamended bill passed the House of Commons for the third and last time on May 25, 1914, and became law under the Parliament Act of 1911. (See ENGLAND.) It was then sent to the Lords, and a month was given for its consideration. The Lords refused to act upon the Home Rule Bill until the amending measure was before them. The Upper House passed the amending bill on its second reading on July 6, and then proceeded to modify it radically. Ignoring the large numbers of Home Rulers in Ulster, the entire province was to be excluded from the jurisdiction of the Dublin Parliament. There were further amendments, and the bill passed its third reading on July 15. Five days later the Commons took up the measure as amended for extended consideration. The King, in an effort towards an amicable adjustment, called a conference of the leaders of all the parties. After prolonged meetings no agreement was reached, as Sir Edward Carson demanded the entire exclusion of Ulster, and Mr. Redmond felt he could not sacrifice the Ulster Nationalists, who had suffered most for the cause of Home Rule. Civil war in Ireland seemed imminent when a truce was declared by both parties as a result of the entrance of Great Britain in the Great European War of 1914. Mr. Asquith's Amendment Act allowing the counties of Ulster to decide for themselves was passed, but its operation was postponed for one year. See WAR IN EUROPE.

While the agitation for Home Rule has seemingly overshadowed everything else, those who know Ireland from within are aware that Irish thought upon Irish problems, during the last 20 years, has been undergoing a silent revolution. Among the new forces in Irish life are two, which stand apart from all political and religious struggles and deserve more than passing notice. One is the Irish Agricultural Organization Society, inaugurated in 1894 mainly through the efforts of Sir Horace Plunkett; the other is the Gaelic League, founded by Dr. Douglas Hyde in 1903. The former aims to do in the industrial what the latter attempts in the intellectual sphere, the rehabilitation of Ireland from within. At a meeting in December, 1913, Father Finlay, S.J., the chairman of the I. A. O. S., announced that their societies had increased to nearly 1000. These include industrial societies, creameries, agricultural societies for the purchase of seed, implements, etc., on coöperative lines, and credit societies, which loan money at low rates of interest, thereby freeing the small farmer from the thralldom of the gombeen man, or usurer. The membership in these societies is over 100,000, while their combined trade amounts to over £2,000,000 a year. This coöperative movement is spreading so rapidly, and in so many different directions, that in the near future it will give a distinct character to Irish industry, constituting the whole community a truly coöperative commonwealth. Equally hopeful is the outlook of the Gaelic League, which has over 964 branches. It is not only fulfilling its declared object—the popularizing of the national language and literature—but it is also developing the intellectual, moral, and social life of the Irish people and has done excellent work in the cause of temperance.

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IRELAND, Church of. The name applied to the independent branch in Ireland of the Anglican communion. It was united with the Church of England by the Act of Union, which went into effect on Jan. 1, 1801. The Established church of Ireland, considering itself the rightful successor of the mediæval Roman Catholic church, took possession of the dioceses, parishes, and Church property, and for a long time retained the divisions then existing. The Roman Catholics, constituting a large majority (more than three-fourths) of the population, always regarded as unjust the existence, in their country, of an Established Protestant church in connection with that of England. Notwithstanding its small membership, the church had, in 1833, 4 archbishoprics, 18 bishoprics, the income from which was estimated at from £130,000 to £185,000. In that year the first inroad was made upon the prerogatives of the Established church in the reduction of the archbishoprics to two and the bishoprics to 10. In 1868, on motion of Gladstone, the English House of Commons voted to disestablish the Church of Ireland. The House of Lords rejected the proposition. But so strong was the expression of public opinion against the continuance of the privileges of the Irish church that the royal commissioners on the revenues and conditions of the Church of Ireland recommended in their report, July 27, 1868, important reductions as to its benefices. They suggested, among other changes, the abolition of four bishoprics and one archbishopric, and that all benefices with less than 40 Protestants should be suppressed. Gladstone introduced, in March, 1869, a new bill for the disestablishment and disendowment of the Irish church, which, after a long and earnest debate, passed both Houses of Parliament and took effect Jan. 1, 1871. The disestablishment was to be total; ecclesiastical courts and laws were to cease; the bishops were to be no longer peers in Parliament; the ecclesiastical commission was to terminate, and a new commission of Church temporalities, composed of 10 men, was to be appointed, in which the whole property of the Irish church should be vested. Public endowments, including state grants or revenues (valued at £15,500,000), were to be retained by the state, and private endowments, such as money given from private sources since 1660 (estimated at £500,000), were to remain with the disestablished church. The vested interests connected with Maynooth College, with the Presbyterians who were receiving the *regium donum*, and the incumbents, were to be secured. The aggregate of the payments would amount to about £8,000,000, leaving £7,500,000 at the disposal of Parliament. A general convention held in Dublin, 1870, adopted a constitution for the disestablished church, according to which it was to be governed by a General Synod, composed of a House of Bishops and a House of Clerical and Lay Delegates, meeting annually in Dublin. The House of Bishops has the right to veto, but seven members must agree upon a veto to render it valid. The bishops are chosen by the diocesan convention, but if the convention fail to elect a candidate to a vacant see by a majority of two-thirds of each order, the election falls to the House of Bishops. The Primate, the Archbishop of Armagh, is elected by the House of Bishops from their own order. The property of the church is vested in a permanent Representative Body, composed of three classes—the ex-officio archbishops and bishops, one clerical, and two lay representatives for each diocese, and the coöpted members chosen by the ex-officio and representative members, and equal in number to the dioceses. One-third of the elected members retire by rotation. In 1912 the Church of Ireland had two archbishops (Armagh and Dublin), 11 bishops, a membership of about 524,000, and £9,403,956 in funds in custody of the Representative Body. The general feeling among the members of this church has been hostile to the introduction of High Church doctrines and practices, and the Prayer Book has, since the disestablishment, been modified in this sense. See England, Church of.

Consult *Reports of the Representative Church Body* (Dublin, 1872–to date); J. T. Ball, *The Reformed Church of Ireland* (London, 1892); Olden, *The Church of Ireland* (ib., 1892).

IRELAND, John (1838–). An American Roman Catholic prelate. He was born at Burnchurch, County Kilkenny, Ireland, Sept. 11, 1838, but was brought to the United States at the age of 11, his parents settling at St. Paul, Minn. In 1853 he was sent to France to be educated for the priesthood, to which he was ordained in 1861 on his return to St. Paul. Here he remained, except for a service of two years as chaplain of the Fifth Minnesota Regiment in the Civil War, becoming rector of the cathedral. In 1875 he was made Coadjutor Bishop of St. Paul, and on Bishop Grace's resignation, in 1884, succeeded him, the see being made metropolitan with the title of archbishop in 1888. The influence of his personality made Archbishop Ireland a commanding figure in many important movements, especially those for total abstinence, for colonization in the Northwest (he was a director of the National Colonization Association), and for the establishment of the Catholic University at Washington. He is the author of *The Church and Modern Society* (1897).

IRELAND, William Henry (1777–1835). A Shakespearean forger, son—probably, though his legitimacy is under suspicion—of Samuel Ireland, engraver and author, born in London in 1777. After attending various private schools he was sent to schools in France, where he remained four years. On returning to London he was apprenticed to a conveyancer. In 1794 he visited Stratford-on-Avon with his father, who was preparing a book descriptive of the town. Here he met John Jordan, a Stratford poet, who had published much gossipy information in regard to Shakespeare, even forging the will of the dramatist's father. After the return of the Irelands to London, William began on his own account a series of remarkable forgeries, which deceived first his credulous father and then many scholars. He produced legal documents, verses, and letters purporting to be Shakespeare's, a number of sixteenth-century volumes with Shakespeare's name on the title-pages, the manuscripts of *Lear* and of a fragment of *Hamlet*, and finally two plays, *Vortigern* and *Henry II*, which he tried to foist as Shakespeare's. On April 2, 1796, *Vortigern* was performed at Drury Lane amid peals of laughter. The same year young Ireland published a written confession, which he enlarged in 1805. Subsequently he wrote considerable verse in imitation of Chatterton, political squibs, and several Gothic romances. He died in London, April 17, 1835. His *Confessions* (1805) were reissued by R. G. White (New York, 1874). In December, 1795, the elder Ireland published facsimiles of the forged documents bearing the title *Miscellaneous Papers and Legal Instruments under the Hand and Seal of William Shakespeare.* These forgeries James Payn made the subject of an interesting novel, *The Talk of the Town* (1885). A collection of the Ireland forgeries in the Birmingham Library was destroyed by fire in 1879.

IRELAND ISLAND. One of the Bermudas. See Bermuda Islands.

IRENÆUS, ī'rē-nē'ŭs (Lat., from Gk. *Εἰρηναῖος, Eirēnaios*), Saint (c.130–c.202). Bishop of Lugdunum (Lyons) and one of the leading Church Fathers of the West. He was born in Asia Minor, perhaps about 130, and died after the year 200. In his youth he had heard Polycarp, Bishop of Smyrna, who had been a disciple of the Apostle John. Thus Irenæus preserves a direct line of apostolic tradition. A fragment in the Moscow manuscript of the *Martyrdom of Polycarp* says that he was then teaching in Rome (155). Some time after this he removed to Gaul, where he became a presbyter in the church of Lugdunum. Pothinus, the aged Bishop of Lyons, suffered death in the persecution under Marcus Aurelius (177), and Irenæus was chosen to succeed him. Shortly before this time he visited Rome again, carrying letters with reference to the Montanists. (See Montanus.) The remainder of his life seems to have been passed in the successful administration of his see. When towards the end of the century the Easter controversy broke out afresh, and Victor, Bishop of Rome, threatened the Asiatic churches with excommunication unless they conformed to the Roman usage, Irenæus intervened with a fraternal letter to Victor, admonishing him to peace. Nothing is known about Irenæus' life after this time. A fifth-century tradition, which cannot be traced further back than Jerome, says that he met a martyr's death in the persecution under Septimius Severus (202). Gregory of Tours gives a full account of the alleged martyrdom in his *History of the Franks.*

Irenæus wrote in Greek. His work *Against Heresies* has survived only in a Latin translation. It was written in Gaul to combat the Gnostic teaching (see Gnosticism) and dates from 181 to 189. It is valuable for the history of doctrine. Fragments of some of his other works are preserved by the later writers. Harnack has recently shown that the so-called 'Pfaffian Fragments' were forged by Pfaff himself. The first edition of Irenæus' works was edited by Erasmus (Basel, 1526). Modern editions are by Migne, *Patrologia Græca*, vi, and (a better edition) Harvey (Cambridge, 1857). An English translation of the *Adversus Hæreses* may be found in the *Ante-Nicene Fathers*, edited by Coxe, vol. i (Buffalo, 1885). In general, consult Cruttwell, *Literary History of Early Christianity* (London, 1893), and Adolf Harnack, *Geschichte der altchristische Literatur* (Leipzig, 1893).

IRENE, ī-rē'nē (Lat., from Gk. *Εἰρήνη, Eirēnē*) (c.752–c.803). Byzantine Empress from 780 to 802. She was a native of Athens and in 768 married Leo, who became Emperor as Leo IV in 775. Her husband died in 780, and Irene became Regent during the minority of her son, Constantine VI. A worshiper of images—in fact, this had during the lifetime of her husband almost caused her disgrace—she quickly began to plot for their restoration and with this purpose assembled a council of bishops at Constantinople (786 A.D.), which, however, was broken up by the opposition of the troops of the capital. A second council held at Nicæa in the following year was more successful, and image worship was reëstablished in the Eastern church. (See Image Worship; Iconoclasm.) In 790 the government was taken out of her hands by the partisans of her son; but in 792 she was again in power, and in 797 she caused Constantine to be blinded and excluded from all power. In 802 her treasurer Nicephorus rebelled, and banished her to the Isle of Lesbos, where she remained until her death, the following year. It is stated by one authority that negotiations were begun for a marriage between Charles the Great and Irene, but these were frustrated by a favorite of the Empress.

Consult: Bury, *Later Roman Empire*, vol. ii (London, 1889); Diehl, *Figures byzantines*, vol. i (Paris, 1909); McCabe, *The Empresses of Constantinople* (Boston, 1913).

IRENE, Saint (c.1084–1124). A Byzantine Empress, daughter of Ladislas I, King of Hungary. In 1104 she married Emperor John II, but she had lived for some time in a cloister before 1124, when she died. She was canonized by the Greek church for her piety and charity. The name St. Irene is often incorrectly applied to Irene, the wife of Leo IV and enemy of the Iconoclasts.

IRETON, ĭr′ton, Henry (1611–51). An English general of the Commonwealth. He was the eldest son of German Ireton, of Attenborough, Nottinghamshire. He graduated B.A. at Trinity College, Oxford, in 1629, and studied law at the Middle Temple, London, but at the outbreak of the Civil War offered his services to the Parliament. He served under Manchester in 1644, with the rank of quartermaster-general. At Naseby, in 1645, as commissary general, he was in command of the left wing, and, his lines having been broken by the furious charge of Rupert, he was wounded and taken prisoner, but regained his liberty when Cromwell's Ironsides decided the fortunes of the day. Later in the same year he became a member of Parliament and took an active part in its disputes with the army. At first he favored a settlement between the King and Parliament and was the chief author of "the Heads of the Proposals," but upon being convinced of the impracticability of such an arrangement he became the King's implacable enemy and was one of those who signed his death warrant. His connection with Cromwell, whose daughter Bridget he married in 1646, greatly advanced his interests. When Cromwell went to Ireland to subdue that country, he was accompanied by his son-in-law, on whose vigor, judgment, and tact he placed much reliance. Cromwell's presence, however, was soon required in Scotland, and the complete subjugation of Ireland was intrusted to Ireton. His career was brief, severe, but successful. He compelled the surrender of Carlow, Waterford, Duncannon, and Limerick, and inaugurated a policy of civil government which was marked by fairness and religious sincerity. He died of an epidemic fever at Limerick. His remains were conveyed to England and interred in Westminster Abbey; but after the Restoration they were disinterred, hanged, and burned at Tyburn.

IRGENS, Johannes (1869–). A Norwegian statesman, born at Aas, where his father was professor of mineralogy in the Agricultural High School. He was educated at the University of Christiania, was in the consular service at Bordeaux and Antwerp in 1892–95, practiced law in Christiania for 10 years, was Secretary of the Norwegian Legation in London in 1906–08 and then Minister to the Court of St. James's in 1908–10. In 1910–13, in the Konow and Bratlie cabinets, he was Minister of Foreign Affairs.

IRI, ē′rē. A river of Greece. See Eurotas.

IRIARTE, ē′rē-är′tā, Ignacio (1620–85). A Spanish landscape painter, born at Azcoitia in Guipuzcoa. He studied under Herrera in Seville and was one of the original members and the first secretary of the Academy of Seville, founded by Murillo (1660). He painted the backgrounds in some of Murillo's pictures, and Murillo in turn furnished the figures for his friend's landscapes. There are four well-composed, conventional landscapes by him in the Prado Museum at Madrid which show his talent as colorist; others in the Louvre and the Hermitage. Murillo said of him that "he painted landscape so well, he must be inspired."

IRIARTE, or **YRIARTE, Y OROPESA**, ē′rē-är′tā ē ō′rō-pā′sā, Tomás de (1750–91). A Spanish poet, born at Orotava on the island of Teneriffe, Sept. 18, 1750; educated at Madrid under the care of his uncle, Juan de Iriarte, the head of the Royal Library. He began very early to translate French plays and to compose plays of his own. For his maintenance, however, he depended throughout his life upon the income derived from certain minor posts to which he was appointed in the Ministry of Foreign Affairs and of War and from other administrative appointments. The tranquillity of his career was somewhat disturbed by numerous literary quarrels with other writers of the time, notably with Juan Pablo Forner, and in 1786 he was summoned before the Inquisition to answer a charge of adherence to the doctrines which the French philosophers were then disseminating—a charge from which he seems, however, to have had little difficulty in clearing himself. He died at Madrid, Sept. 17, 1791. Much of his published verse consists of translations, most of which are not so good as his original poems. Among these are the *Epistles*, one of which forms the dedication of his translation of Horace's *Ars Poetica* to his friend Cadalso, and a didactic work, *La musica*, a discussion of the elements of music, which attracted attention abroad and won him praise from Metastasio. But his permanent fame is based upon his versified fables, the *Fábulas literarias*, still among the most popular in Spain. In their content these show considerable skill on Iriarte's part in adapting the peculiarities and habits of animals to doctrinal purposes; in their form they also display his ingenuity, being written in a great variety of metres with a due regard for harmony and symmetry. The fables were translated into many European languages. Belfour's *Literary Fables Imitated from the Spanish of Yriarte* appeared in London in 1806, and Rockliff's rendering of Iriarte reached a third edition in 1866. His name is given in the *Catálogo de autoridades de la lengua*, published by the Academia Española.

Bibliography. Iriarte, *Colección de obras* (Madrid, 1805); *Biblioteca de autores españoles*, vol. lxiii (ib., 1891), containing his poems; Iriarte, "Poesías inéditas," in *Revue hispanique*, vol. ii (Paris, 1895); Cotarelo y Mori, *Iriarte y su época* (Madrid, 1897); "Proceso inquisitorial contra Iriarte," in *Revista de Archivos, etc.*, vol. iv (1900).

IRIARTEA, ĭr′ĭ-är′tē-ȧ (Neo-Lat., named in honor of Juan de Iriarte, a Spanish amateur botanist). A genus of South American palms which have lofty, smooth, faintly ringed stems, and pinnate leaves with somewhat triangular leaflets. The pashiuba or paxiuba palm (*Iriartea exorrhiza*, by some botanists called *Socratea exorrhiza*), common in low, wet grounds in the forests of the Amazon district, is remarkable for its aërial roots, which extend from the stem obliquely downward and often divide into many rootlets just before they reach the soil. As the tree grows, it produces new roots from higher points. Since the older and more central ones die, a man may walk erect under a palm of 70 feet high, supported as on legs rising straight above his head. The outer wood, which is very hard, is used for harpoons. It splits easily into straight laths, is excellent for floors, ceilings, shelves, etc., and is exported for umbrella sticks. The leaves are extensively used in Brazil as thatch.

IRIDACEÆ, ĭr'ĭ-dā'sē-ē (Neo-Lat. nom. pl., from Lat. *iris*, Gk. *ἶρις*, *iris*, rainbow, sort of lily), or IRIS FAMILY. A family of monocotyledonous plants, consisting mostly of herbaceous perennials, with tubers or rhizomes. The leaves are usually in two rows and equitant (i.e., so placed that one seems to fit over the back of the other). The perianth is six-parted, colored, and in some kinds very beautiful. The stamens are three with anthers turned outward. The ovary is inferior, with one style and three stigmas, which are often petal-like and add much to the beauty of the flower. The fruit is a three-celled capsule containing many seeds with small embryos in a hard endosperm. There are about 60 genera and 800 species known in temperate and tropical countries. South Africa and tropical America contain the greatest number. Some species, however, range to rather high latitudes. Familiar examples of the family are the garden irises, crocuses, gladioli, etc. Some species have acrid properties, while the corms of others are edible, and others have medicinal properties of considerable value. The representatives of the family indigenous in the United States are species of *Iris* (flag), *Nemastylis*, and *Sisyrinchium* (blue-eyed grass). Two additional genera, *Calydorca* and *Blerbertia*, grow in Texas, and there may be others farther west. See accompanying Colored Plates of IRIS FAMILY and FLEURS-DE-LIS.

IR'IDEC'TOMY. See CATARACT.

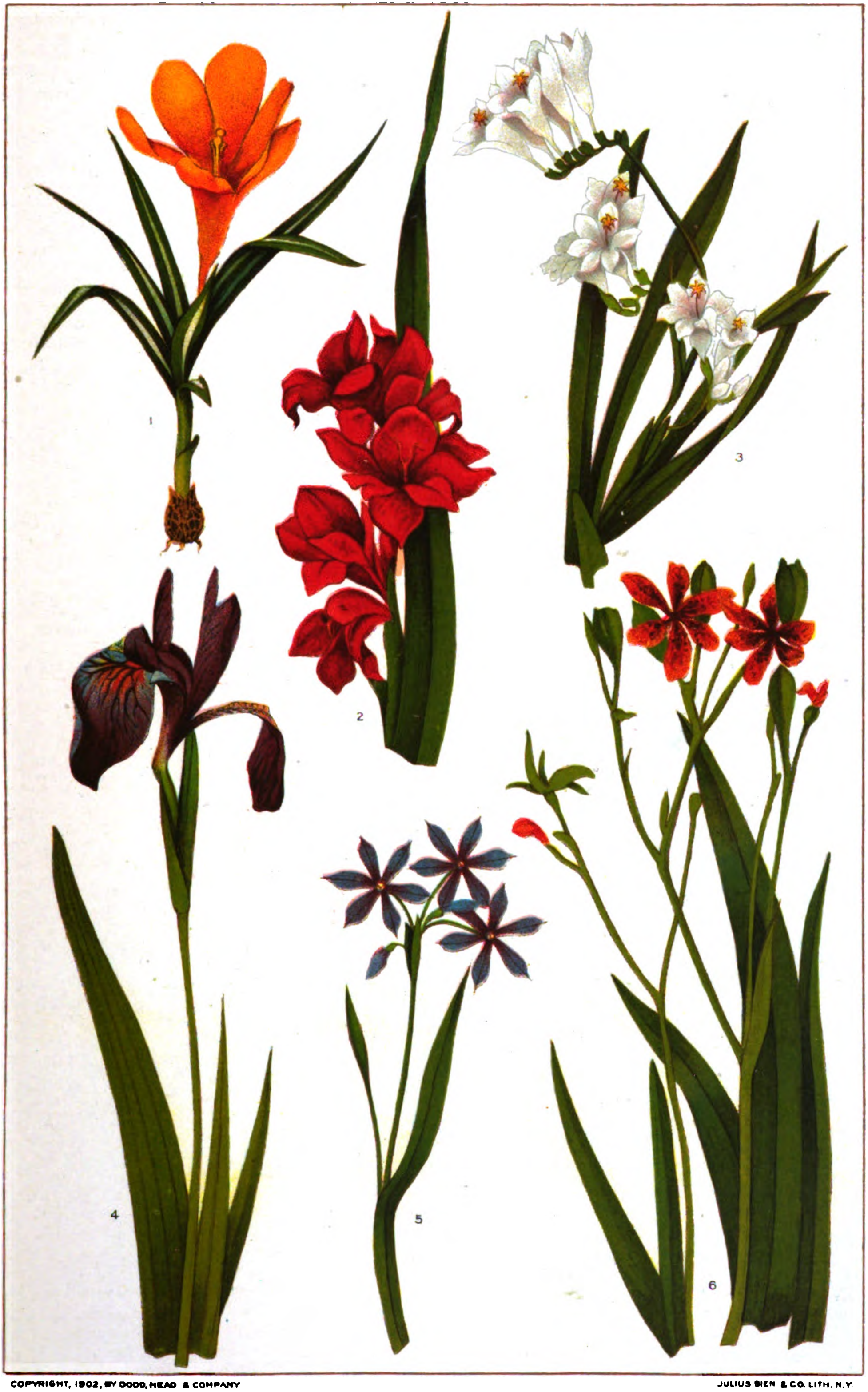
IRIDESCENT (ĭr'ĭ-dĕs'ent) **GLASS** (from Lat. *iris*, Gk. *ἶρις*, *iris*, rainbow). Glass containing a display of changing colors on the surface somewhat similar to the delicate hues of soap bubbles. It is produced by rendering the surface of the glass imperceptibly uneven, either by artificial means or by the natural process of incrustation and decay. One form of treatment consists in applying to the surface of the glass to be treated a strong solution of hydrochloric acid under pressure in a closed vessel. Another method in use in many factories is to apply the fumes from chloride of tin or other chlorides volatilized in a reheating furnace. Glass which has for many years been submitted to the slowly disintegrating influences of natural causes, such as damp, successive heat and cold, light and darkness, will in many instances display an iridescent play of colors. The cause is due to a process of decomposition in the texture of the glass, resulting in the formation of minute scales. The action of water on glass has a tendency to extract the potash and soda which enter into its composition, together with a portion of the silica, the decomposition taking place with greater ease in proportion as the glass is richer in these alkalies, and more minutely divided, and the temperature of the water higher. The moisture in the atmosphere produces a similar alteration in the lapse of time. It separates the potash and soda, leaving the greater part of the silica with the lime on the surface of the glass. It is this decomposition which causes the prismatic colors. If subjected to heat, numerous fine scales will peel off and leave the surface dull, opaque, and wrinkled. Many attempts have been made to imitate by artificial means the singular display of changing hues, and varied success has attended the efforts. In Venice the workers succeeded in giving the surface of their glassware a peculiar kind of metallic iridescence, and a similar result was reached by certain Hungarian glassworkers. The beautiful *Favrile Glass* made by Tiffany of New York in many styles and colors has a most striking iridescent play of color. See GLASS.

IRID'IUM (Neo-Lat., from Gk. *ἶρις*, *iris*, rainbow; so called on account of its iridescence). A metallic element discovered in 1802 by Smithson Tennant. It is found in platinum ores—as osmiridium, a native alloy of iridium and osmium in varying proportions—and in the form of native alloys with the other platinum metals. The principal sources of these ores are various districts in the Ural Mountains, and on the Pacific coast of the United States. The preparation of metallic iridium involves its separation from the accompanying metals by a long and complicated process.

Iridium (symbol Ir; atomic weight, 193.1) is a white steellike metal, brittle when cold, and somewhat malleable at a white heat. In its ordinary, compact form, iridium is insoluble not only in the several mineral acids, but also in aqua regia; the latter reagent, however, dissolves iridium powder, which may also be converted into the oxide Ir_2O_3 by heating in the air. Iridium has a specific gravity of 22.4, and it melts at about 2200° C. (about 4000° F.). It combines with oxygen to form an iridium sesquioxide, Ir_2O_3, and an iridium dioxide, IrO_2, which in turn give rise to iridious and iridic salts. As Wöhler and Witzmann showed, in 1908, an oxide of the formula IrO does not exist, although iridium sulphide, IrS, may be readily enough obtained by heating metallic iridium in sulphur vapor. Similarly, iridious chloride, $IrCl_3$ (corresponding to the oxide IrO) is obtained by passing chlorine over spongy iridium. The metal itself alloys with copper, gold, and lead, as well as with other platinum metals, and the alloy consisting of nine parts of platinum with one part of iridium is extremely hard, as elastic as steel, perfectly unalterable in the air, and capable of taking a high polish. It is of this alloy that the international prototype standard meter kept in Paris was made. Iridium is also used for the manufacture of standard weights, knife edges of balances, and for other articles which it is desired to preserve from the influence of the atmosphere. It is also used to tip the edges of gold and other pens so as to produce a very hard surface. William L. Dudley invented a process for the electrolytic deposition of this material, and his process has been successfully used for coating surgical instruments and other articles requiring an exceedingly hard surface. Gutbier and Hoffmeier, in 1905, obtained a colloidal solution of iridium (see COLLOIDS) by reducing iridium chloride, in the presence of some gum arabic, with hydrazine hydrate. See HYDRAZINE.

IR'IDOS'MINE (from *irid*-ium + *osmium*). A native alloy of iridium and osmium that crys-

IRIS FAMILY



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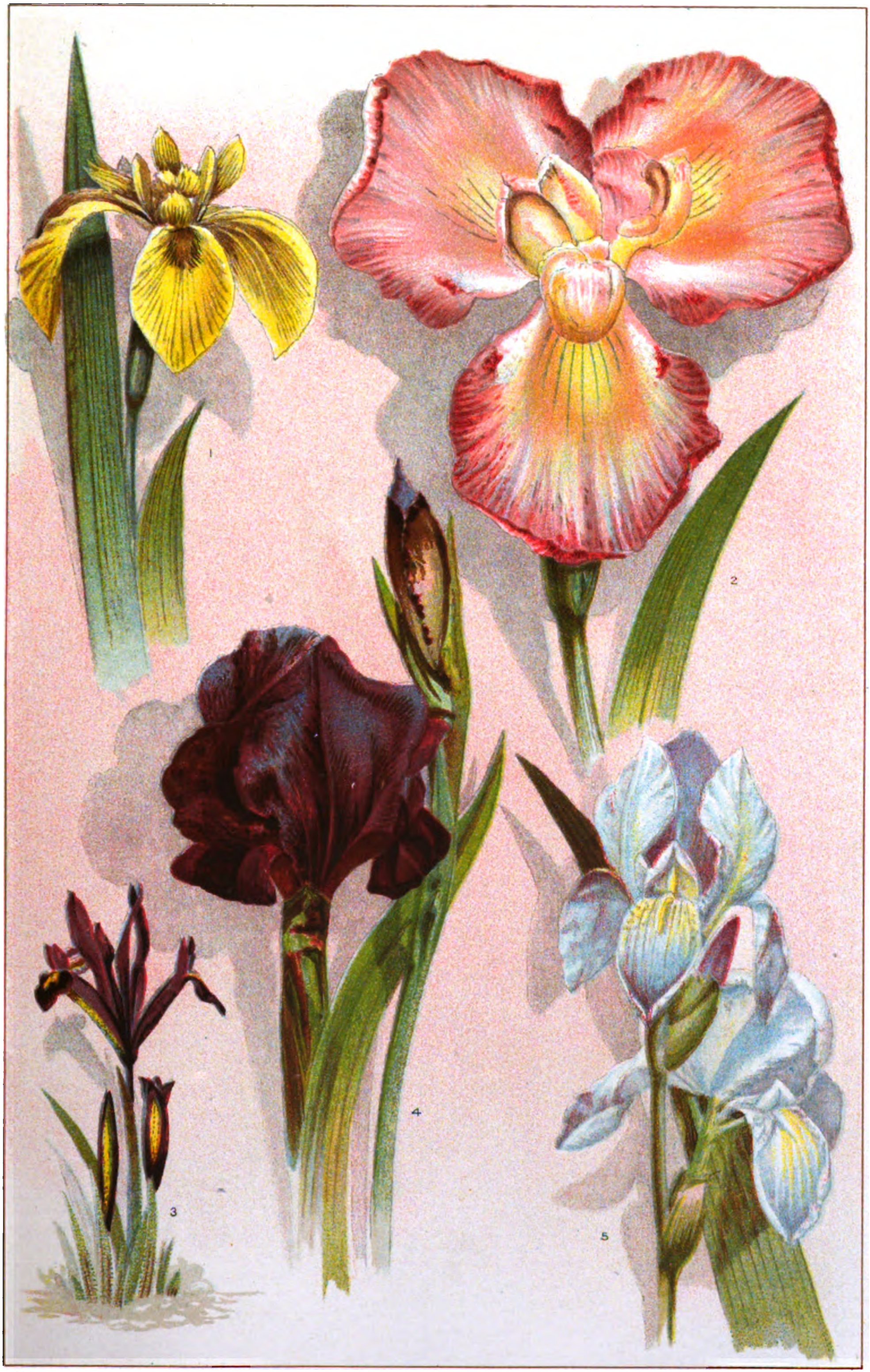
1 YELLOW CROCUS — CROCUS SUSIANUS
2 GARDEN GLADIOLUS — GLADIOLUS COMMUNIS
3 FREESIA — FREESIA REFRACTA
4 BLUE FLAG — IRIS VERSICOLOR
5 BLUE-EYED GRASS — SISYRINCHIUM GRAMINOIDES
6 BLACKBERRY LILY — BELAMCANDA PUNCTATA

FLEURS-DE-LIS



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JULIUS BIEN & CO LITH N.Y

1 ENGLISH YELLOW IRIS – (IRIS PSEUDACORUS)
2 JAPANESE IRIS – (IRIS LÆVIGATA)
3 NETTED IRIS – (IRIS RETICULATA)
4 CUSHION IRIS – (IRIS ATROPURPUREA ATROFUSCA)
5 FLORENTINE IRIS (IRIS FLORENTINA)

tallizes in the hexagonal system. It is tin white to light steel gray in color and has a metallic lustre. The proportions of iridium and osmium in it vary, and other platinum metals, such as platinum, rhodium, and ruthenium, are frequently present. The mineral occurs with platinum minerals in the Ural Mountains, in the auriferous drifts and sands in New South Wales, and in northern California.

IRIGA, ē-rē'gȧ. A town of Luzon, Philippines, in the Province of Ambos Camarines. It lies on the right bank of the Buhi River, 23 miles southeast of Nueva Cáceres, and had a population (1903) of 19,297. Near by is an extinct volcano nearly 4000 feet high.

I'RIS. An opera by Mascagni (q.v.), first produced in Rome, Nov. 22, 1898; in the United States, Oct. 16, 1902 (New York).

IRIS (Lat., from Gk. Ἶρις). In Hesiod, the daughter of Thaumas and Electra, and sister of the Harpies. (See Harpy.) In the Homeric poems she is the virgin messenger of the gods; but Alcæus and later writers state that she was the wife of Zephyrus and the mother of Eros. She is frequently represented on vases and in bas-reliefs as a youthful winged virgin, with a herald's staff. The name in Greek means 'rainbow,' and, though Vergil (*Æneid*, iv, 700–702) is the first writer to represent the bow as the path of the goddess, there can be no doubt of their original connection. It may be noted that to the Greeks the rainbow was a divine portent, presaging war or heavy rain. Consult Mayer, "Iris," in Roscher, *Lexikon der griechischen und römischen Mythologie*, vol. ii (Leipzig, 1890–94).—Iris is also the name of one of the planetoids (q.v.), discovered in 1847.

IRIS (Lat., from Gk. ἶρις, rainbow, sort of lily), or Flower-de-Luce, *Fleur de lis* in French. A genus of plants of the family Iridaceæ, having the three outer segments of the perianth reflexed, the three inner arched inward, and three petal-like stigmas covering the stamens. The species, about 875, are chiefly natives of temperate climates, especially of North America, Europe, and Asia. The yellow iris, or corn flag (*Iris pseudacorus*), is a well-known native of moist grounds in many parts of Europe, often spreading over a considerable extent of land, and conspicuous even at a distance by its tall leaves and large, deep-yellow flowers. It is also established in a few places in the eastern United States. The stinking iris (*Iris fœtidissima*), a species with livid purple flowers and ill-smelling leaves, is very abundant in the south of England, but does not extend far north. The flowers of most of the species are beautiful. Some of them have received much attention from florists, particularly *Iris xiphium*, sometimes called Spanish iris; *Iris xiphioides*, or English iris; and *Iris germanica*, or common iris, all European cormrooted species; and the Japanese irises, which probably are all referable to *Iris lævigata*. Many fine varieties have been produced. The Persian iris (*Iris persica*) is delightfully fragrant; the snake's-head iris (*Iris tuberosa*) and the Chalcedonian iris (*Iris susiana*) are also much esteemed. The roots of all these species are annually exported in considerable quantities from Holland. Many other species are of frequent occurrence in flower gardens, such as *Iris reticulata* and *Iris atrofusca*. The fresh rootstocks of *Iris pseudacorus* are very acid. Those of *Iris florentina*, *Iris pallida*, and *Iris germanica* are orris root (q.v.). Some species have edible rootstocks. *Iris versicolor*, the large blue flag, is common in wet places through the United States as far west as Minnesota and Arkansas. *Iris cristata* is a dwarf species with fragrant flowers found in several localities, and *Iris verna* and *Iris lacustris* are other dwarf American species, all of which are cultivated as border plants to a considerable extent. See Iridaceæ and accompanying Colored Plates.

IRIS (Gk. ἶρις, *iris*). A term used in anatomy to denote the thin circular curtain, pierced by the pupil, which hangs in the anterior chamber of the eye in front of the crystalline lens. It is attached by its peripheral margin to the sclera, and its posterior surface is pigmented. See Eye; Vision; Iritis.

IRIS FAMILY. A family of plants. See Iridaceæ.

IRISH. See Celtic Languages; Irish Literature.

IRISH ACADEMY, Royal. A learned association in Dublin, Ireland, which developed from a society of gentlemen, chiefly of the university, which was established in Dublin in 1782. Its object was to promote the study of science, polite literature, and antiquities. It was incorporated in 1785. The first volume of its transactions appeared in 1788. It is governed by a council consisting of 21 members, divided into three committees, viz., the committee of science, the committee of polite literature, and the committee of antiquities. The meetings of the council are distinct from those of the academy at large and are held every month from November to June. The library contains a collection of Irish manuscripts, in themselves invaluable, besides papers of public interest, including those of the Ordnance Survey of Ireland. Since 1870 the academy has been publishing the more important of its Irish manuscripts. Its collection of Irish antiquities on exhibition in the National Museum, Dublin, under the science and art departments of the academy, is both interesting and important.

IRISH CATHOLIC BENEVOLENT UNION. A fraternal and benevolent organization, founded at Dayton, Ohio, in 1869. The membership in the union is confined to those who are members of the Roman Catholic church. There were in 1914 four national societies and 137 subordinate societies. The membership is about 15,000. Since its organization the union has disbursed about $2,650,000. During the fiscal year 1913 there were disbursed for benefits about $54,000.

IRISH DEER. See Deer; Elk.

IRISH GAELIC LITERATURE. See Irish Literature, I.

IRISH HARP. The oldest accounts describe this instrument, not as triangular, in which form it has served for centuries as the national emblem, but as quadrangular, thus resembling the crowd (q.v.). It seems that the triangular form came into Ireland from England towards the end of the tenth century, when it was a very rude instrument with strings made of untanned hide or twisted horsehair. Early in the eleventh century we have accounts of Irish bards possessing wonderful skill, playing on triangular harps having strings of gold and silver. At any rate, metal strings were used, and the front pillar was gracefully curved. The number of strings varied from 8 to 18, producing the diatonic scale of G. Only the right hand was used in playing, and the strings were picked with the finger nails, which the harpers allowed to grow long. The ordinary harp was a little over 2 feet in height and was held on the lap, although illustrations from the fourteenth century represent also larger sizes resting on a stool. In this improved form the instrument passed again to England and to the Continent, where it underwent further development, culminating in the invention of the pedal harp and the double pedal Erard harp (see HARP); while in Ireland it maintained itself practically unchanged, except for a gradual increase in the number of strings to 30. An attempt made by John Egan about 1800 to introduce an improved Irish harp was unsuccessful. On the other hand, the new Irish harp, improved by the application of modern scientific principles by the American harp virtuoso Melville A. Clark, holds out every promise of success. Built after a model formerly owned by the poet Thomas Moore, it preserves all the characteristics of size, shape, and general construction, and has, besides, a vastly more powerful and beautiful tone. It is made in two sizes, 25 inches with 26 strings and 39 inches with 31 strings. The first of these instruments were placed on the market in 1913, and their quality demonstrated the same year on a concert tour of the United States by the Irish tenor John McCormack (q.v.) and the inventor. Consult R. B. Armstrong, *The Irish and the Highland Harps* (Edinburgh, 1904), and W. H. Grattan-Flood, *A History of Irish Music* (Dublin, 1906).

IRISH LAND LAWS. The land tenure of Ireland is the product of two distinct systems, the Irish tribal and the English feudal. In the former, as described in the Brehon laws, the land was ultimately the property of one of the four or five tribes into which the Irish population was divided. A portion of this land was set aside for the chief or king of the tribe, but by far the greater part of it belonged to the different clans of which the tribes were composed. The clan lands were subdivided among the septs, which were the lowest social units. Land was set aside both for the chiefs of the clans and the chiefs of the septs. The greater part of the sept land, however, was held by the free tribesmen, who owed both rents and military service to their immediate chiefs. These tribesmen held their lands by different kinds of free tenure. The Ceil had herds of cattle (the chief wealth of the country) of his own, while to the Saer and the Daer tenants cattle were lent by the chief. Besides these there were servile tenants (the Fuidhir), who were not original members of the tribal community. These were personally dependent on the chief, who had a right to quarter his retainers upon them or rackrent them at pleasure. It is impossible to determine the numerical proportion of the population represented by these servile tenants, but it is probable that at the time when the English system was superimposed upon Ireland the free element was predominant.

Under the Irish system land was conceived to be held on a communal basis. On the death of the chief his land was distributed among his descendants by the tribesmen, and on the death of a tribesman the chief redistributed the land of the sept. In contrast to this, under the English feudal system, the King was conceived to be the ultimate owner of the land, and the lords and other tenants derived their ownership from him. The English law in Ireland, however, prevailed only within the Pale, while the Irish law prevailed in by far the greater part of the country. The evils of the Irish land system are to be ascribed to the dispossession of the native population and to the forced imposition of the English land law upon Ireland. The dispossession began under Queen Mary, when the Irish were driven out of King's and Queen's counties and the English settlers established there. Under pretext of the treason of two Ulster chiefs, James I in 1607 established the famous Ulster plantation. Later in his reign confiscations, though not such extensive ones, were made. All Ireland was divided into shires and declared subject to English laws. This policy was continued during the succeeding reigns, but no second great confiscation was attempted until the time of the Commonwealth. After his Irish victory Cromwell divided the best lands of Leinster and Munster and a part of the lands in Ulster among 40,000 of the English soldiery. A small portion of this land was restored under Charles II and James II, but more was confiscated by Parliament under William III.

The effect of these measures was to dispossess almost the entire Irish nobility and gentry. The penal laws enacted by the Irish Parliament after the defeat of James II carried this principle still further by making it impossible for a Catholic to acquire land. The confiscation acted with equal severity upon the lower classes. The English law confounded all Irish tenantry with the Fuidhir class, reducing them thus to a servile status. The lands were increasingly held by absentee landlords, who endeavored to obtain the highest possible rents. The large number of middlemen who held land under the lords and acted as their agents made the condition of the peasantry still worse. The need of reformation was seen by all classes, but was not fully realized by English statesmen until the report of Lord Devon's commission, which was appointed in 1843 and sat for two years. This report, backed by the famine of 1846, showed conclusively that the cause of the poverty and suffering in Ireland was not due, as was generally supposed in England, to the shiftlessness of the Irish people, nor yet to their religion, but to the disastrous relations that existed between landlord and tenant. It recommended that the tenant receive from the landlord compensation for the improvement of his holding. Accordingly in 1847 Lord Russell proposed a measure providing for such compensation in cases of eviction, but it was rejected by Parliament. His second measure, the Encumbered Estates Act, however, was accepted. This act compelled the sale of estates upon which the rents were mortgaged, the idea being that a new set of solvent landlords would not need to rackrent the tenants. This act, however, was a failure. Estates to the value of £25,000,000 were sold for £10,000,000 and the incoming landlords, regarding their possessions as purely financial investments, had less consideration for the customs which formerly safeguarded the tenantry than their predecessors.

In 1850 the Tenant Right League, composed alike of Presbyterians and Catholics, was founded at Dublin. It contended for fair rents by actual valuation, excluding the improvements made by the tenantry, for continued possession of the holding by the tenant as long as valuation rents were paid, and for relief from arrears of rent due from the time of the famine. The League entered actively into political affairs, and in 1852 sent 50 members to Parliament pledged to adhere to no party that did not support the principles of the League. Three of its leaders were won over by the Liberal cabinet, and its strength was broken by the opposition of the Roman Catholic hierarchy and the holy see. In consequence of renewed agrarian disturbances, the Palmerston ministry brought forward the Land Acts of 1860.

The first really efficient land legislation enacted for Ireland was a consequence of the attempted Fenian rebellion and was the work of the Gladstone ministry in 1870. It established the Ulster custom throughout Ireland. This custom provided that tenants could not be evicted while their rents were paid, and that whenever a tenant gave up possession, either voluntarily or otherwise, he might sell his own improvements. Evictions for nonpayment of rent could only be made in case of three years' arrears, and could not be made at all in cases where the rent was under £15 if the court deemed the rental exorbitant. When a holding was relinquished, a tenant could legally claim compensation for his own improvements from the landlord. The Bright clause provided for the purchase of the holding by the tenant by enacting that the Board of Works should advance two-thirds of the purchase money.

The Act of 1870 failed, however, to remedy the existing evils.

The Land Act of the second Gladstone ministry, passed in 1881, was a result of the disturbances fostered by the Land League (q.v.). It was drawn up by Forster, the Irish Secretary. This act recognized that the tenant had a possessory right in the holding, by the provision that he might sell it for whatever it would bring, subject only to the landlord's right of preëmption. Except for the nonpayment of rent, the tenant could not be evicted. In case of the increase of rent he could apply to the land commission, established by the act, and procure a rate which would hold for 15 years. This commission also provided for the easy payment of arrears. The clause providing for the purchase of the holdings by the tenants was strengthened in 1885 by the Ashbourne Act, which advanced £5,000,000 for this purpose. In 1887 an additional £5,000,000 was advanced. The Balfour Land Purchase Bill passed by the Conservatives in 1891 continued the same policy. It provided for purchase based on voluntary agreement between landlord and tenant, the government advancing the entire purchase money, such sum to be repaid by the tenants in 41 annual 4 per cent payments. The fund created for this purpose was £30,000,000, a sum deemed sufficient to establish peasant proprietorship in Ireland. John Morley's Land Law of 1896 improved the application of the law. Nevertheless, agitation did not cease, and in January, 1898, the United Irish League was founded, which aimed, among other things, to agitate for the abolition of the dual ownership of land, and the redistribution of the grazing ranches of Connaught among the small holders. In 1902 a conference between representatives of the landlords and tenants to settle the land question was urged, and a preliminary meeting was held at Dublin on Dec. 20, 1902. As a result of the agreements reached at that meeting, the Balfour government introduced, on March 25, 1903, a comprehensive measure, known as the Wyndham Act, which went into effect on November 1. It provided for the creation of a land purchase fund not to exceed £100,000,000, by the sale of treasury stock, the proceeds to be loaned to tenants to enable them to acquire title to the lands they were occupying. Of the fund, £12,000,000 was to be distributed in the form of bonuses to the vendors of estates. The amount which each tenant might borrow was limited to £5000 or, in exceptional cases, £7000, and the loans were made repayable in 68½ annual installments that were on the average calculated to be 15 per cent less than the judicial rent for 1903 would have been.

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IRISH LANGUAGE. See CELTIC LANGUAGES.

IRISH LANGUAGE, SOCIETY FOR THE PRESERVATION OF THE. A society with headquarters in Dublin founded in 1876 for the restoration of the ancient Gaelic tongue as a spoken language. The movement of which this organization is the result had its origin in Boston, Mass., in the Philo-Celtic Society, which was organized in 1873. From there it spread to other parts of the United States and finally attracted the attention of scholars in Ireland, where eventually the society became firmly established. Its publications are mainly textbooks of the Gaelic language designed for schools and colleges, and especially in demand after Gaelic became a subject taught in the government schools. See IRELAND.

IRISH LEAGUE OF AMERICA, THE UNITED. See UNITED IRISH LEAGUE OF AMERICA, THE.

IRISH LITERARY REVIVAL. See IRISH LITERATURE, II.

IRISH LITERARY SOCIETY. A society for the study of the Irish language, literature, history, music, and art, founded in London in 1892 by a small coterie of young Irishmen and Irishwomen, with the coöperation of leading Irish literary men in England and Ireland. The society has a large library of Irish books and during each season provides lectures on Irish subjects and social entertainments for its members and their friends. The membership is about 600 and includes the names of many prominent littérateurs, among whom may be mentioned Rev. Stopford Brooke, W. B. Yeats, Justin McCarthy, and Barry O'Brien. A sister institution is the National Literary Society of

Ireland, which has its headquarters in Dublin, holds weekly meetings, and has aims and functions similar to those of the former association. It is very active in publishing and in offering courses of lectures. It publishes books concerned with the interests it was founded to further.

IRISH LITERATURE. **I. Gaelic.** Irish literature shows an unbroken, if varying, continuity from the seventh or eighth century until the nineteenth. In its earlier periods it is of especial interest and in some kinds of production ranks with the richest literatures of mediæval Europe.

Three periods are regularly recognized by scholars in the history of the Irish language: Old Irish, from the time of the earliest monuments through the tenth century; Middle Irish, from the eleventh century to the seventeenth; and Modern Irish, from the seventeenth century to the present time. It is convenient to follow the same divisions in treating the history of Irish literature, though there is no such well-defined distinction between the literary productions of successive periods as between the corresponding stages of the language.

Old Irish.—There is an abundance of material for the study of the Old Irish language. The most archaic stage is represented by the Ogam inscriptions, some of which date from the fifth and sixth centuries and even earlier. They contain little besides proper names, but these are of great interest for the light they throw upon the beginnings of Celtic phonology and inflection. (See OGAM.) From the period between the seventh and the tenth century a score or more of manuscripts have been preserved containing thousands of Irish glosses, and on the basis of these a very complete grammar of the Old Irish language has been constructed. Unfortunately only a few continuous Irish texts exist in any of these early manuscripts. An ancient Latin-Irish sermon, a short sketch of St. Patrick's life, a few poems and incantations—this is about all that is preserved of the oldest Irish literature in contemporary copies. We have to wait for the Middle Irish manuscripts before we find much direct evidence of its character. However, many of the texts in these later manuscripts are composed in a language only half contemporary with the writers; they abound in archaic forms, which make it safe to set them down as being substantially Old Irish, in spite of the circumstances of their preservation. The reason for the scarcity of early literary monuments is to be found in the political conditions of Ireland from the eighth to the tenth century. This was the Viking age, and Ireland with the rest of western Europe suffered from the ravages of the Norsemen. Monasteries were repeatedly sacked and burned by the Scandinavian invaders, and few libraries survived the struggle. Nearly all the manuscripts of the Old Irish period have been preserved on the Continent.

Middle Irish.—In 1014 the Scandinavians were defeated in the battle of Clontarf, and from that time forth their power in Ireland declined. From the period between about 1100 and about 1500 there has come down to us a great body of manuscripts containing a vast variety of writings in both prose and verse. Among the most important of these Middle Irish manuscripts are the *Liber Hymnorum* (ed. by Bernard and Atkinson, London, 1895), and the *Book of the Dun Cow* (facsimile reprint, ib., 1870), written about 1100; the *Book of Leinster* (facsimile reprint, ib., 1880), of the twelfth century; the *Yellow Book of Lecan*, the *Leabhar Breac* (Speckled Book), and the *Book of Ballymote*, all of the fourteenth century; and the *Book of Lecan*, from about the beginning of the fifteenth.

The religious element in Middle Irish literature, consisting of hymns and sermons, theological treatises, and lives of saints, bears a general resemblance to contemporary writings in other vernacular languages of Europe. The poetry is largely conventional and technical, but it often reveals a fine fancy and a strong love of nature.

In metrical form it is highly intricate and shows great artistic skill. Chief interest, however, attaches to the heroic sagas, which constitute the best contribution of the Irish to the world's literature. These hero tales fall into three main groups: (1) the so-called *mythological* cycle, which relates various traditions about the early settlement and conquest of Ireland and extends to near the beginning of the Christian era; (2) the *Ultonian*, or Red-Branch, cycle—the most complete, productive, and brilliant of the three traditional epochs—which tells of the wars between Ulster and Connaught in the time of King Conchobar and is identified with the period immediately before and after the commencement of the Christian era; and (3) the *Ossianic* cycle, which extends to the middle of the third century A.D. The tales of the first group are chiefly interesting for the light they seem to throw on the ancient Celtic pantheon. The characters are generally held to be derived by a process of euhemerism from the gods of the old mythology. The stories belonging to this period are fewer in number than those belonging to the later periods. Two of the *Three Sorrows of Story-Telling* are connected with this cycle, i.e., the *Aided or Tragedy of the Children of Tuireann* and *The Tragedy of the Children of Lir*, the latter dealing with the struggles between the Milesians and the Tuatha De Danann, races of demigods vying with each other for the supremacy of Ireland. The cycle of King Conchobar of Ulster represents ancient Irish literature at its best. Some 96 tales have been classified as belonging to this cycle, whose heroes are Conchobar, Cuchulinn, Fergus MacRoich, Conall, Celtchar, and Curigh. Among the most important of these sagas are the great prose epic *Táin Bó Chuailgné, or The Raid of the Cattle of Cooley*, *Deirdre and the Sons of Uisneach*, the *Conception and Training of Cuchulinn*, the *Wooing of Eimer*, the *Battle of Rosnaree*, *Cuchulinn's Adventure at the Boyne*, *Eimer's Jealousy*, *Briciu's Banquet*, *the Death of Conlaoch*, the *Death of Cuchulinn*, and the *Recovery of the Táin*. While not uninfluenced by foreign thought, these old sagas are in the main a representative national product, and they furnish the best existing record of what the ancient Celtic people must have been. They were composed in a mixed prose and verse, which long remained the typical Irish epic form. Many of the sagas of this group seem to have taken practically their final shape before the end of the Old Irish period. The third cycle—that of Finn and Ossian—is found in later manuscripts than the second, and the tales are composed in a more modern language. The events with which they deal are supposed to have taken place two or three centuries after those of the earlier group. The wealth of this cycle is so great that, according to O'Curry, its sagas will fill 3000 large quarto pages. Its leading heroes are Fionn, Gol MacMorna, Ossian the son of Fionn, Oscar the son of Ossian, Diarmad O'Duibhne, Caoilte MacRonan, Fergus Finne-bheoil, and Conan Maol. The literature of this cycle is divided into four classes, of which the first consists of poems ascribed to Fionn MacCumhail, to his sons Ossian and Fergus, and his nephew Caoilte, about 16 poems in all; the second class consists of stories in prose and verse attributed to one of the aforementioned bards, but related by some one else, such as *Agallamh na Seanórach*, or *Dialogue of the Ancients;* the third class consists of miscellaneous poems attributed mainly to Ossian and a large number which are ascribed to no particular author, such as the beautiful *Ossian and Evir-Alin;* and the fourth class of prose tales, describing in romantic style the deeds of Fionn and of individuals of his band, such as the *Pursuit of Diarmad and Grainne.* The Ossianic cycle shows more traces of foreign influence, and in the opinion of some scholars owes its origin and character largely to the contact of the Irish with the Scandinavian people. But it is more likely that the stories of Finn were in the main a native product, and they have continued down to this day to be a favorite body of tradition with Irish and Scottish Gaels alike.

In addition to these three saga cycles there exist in Middle Irish manuscripts many separate tales, or groups of tales, of interest and importance. The *Immrama*, or stories of marvelous voyages, deserve special mention, both because they go back to very ancient Celtic tradition and because they appear to have had considerable influence on mediæval literature in other tongues. The *Voyage of Bran*, the oldest and in some respects the most interesting of this series, can safely be dated in the Old Irish period. An entirely different literary vein is represented by the *Vision of MacConglinne*, a satire of which the fun has seldom been surpassed. Far removed from either of these types is the story of the *Sons of Eochaid Muigmedoin*, who have an adventure similar to that related in Chaucer's tale of the Wife of Bath. Middle Irish translations (or adaptations) of foreign material are preserved in considerable number, and represent a wide variety of originals from the tale of Troy to the travels of Sir John Maundeville.

Modern Irish.—Throughout the older periods of Irish literature nearly all the greatest works are anonymous. In the Modern Irish period this is less the case. The later literature is on the whole less significant than the earlier, but the writers, as such, claim more attention. At the beginning of the period stand several prose writers of first importance: the Four Masters, who compiled the greatest collection of Irish annals (ed. by J. O'Donovan, 1857); Duald MacFirbis, the genealogist; and Geoffrey Keating (also a poet), whose religious writings and *History of Ireland* are the standards of classic Irish prose. Treatises in prose, chiefly religious, continued to be written throughout the seventeenth century; but as education declined among the Irish-speaking population, literature of this sort found itself without a public and died out. Poetry, on the other hand, continued to be extensively cultivated; and the work of the modern poets, though it seldom rises high in thought or imagination, possesses great melody and charm. Much of it is distinctly popular in character and has long been common property of the Gaels in both Ireland and Scotland. The seventeenth century witnessed a great change in the form of Irish poetry. The metrical system of the old bardic schools, in which syllable counting and consonantal rhyme were the controlling principles, gave way to a new verse form, in which the accent was the unit of measure and the rhyme was primarily vocalic. The use of vowel rhymes was extended till it applied to all the accented syllables in the line, and a strangely melodious verse form resulted, in which whole poems are constructed with the same accented vowels recurring throughout in orderly sequence. The two systems existed side by side throughout the seventeenth century; but in the eighteenth, after the disappearance of the old bardic schools, the use of the newer metres became practically universal. The chief representatives of the classic style in its final stage were Teig mac Daire and Lughaidh O'Clery (the leaders in the great "Contention of the Bards"), Teig Dall O'Higinn, and Eochaidh O'Hussey. The later school of poets was very numerous, especially in the eighteenth century. Among the most representative of the number were David O'Bruadar, John O'Neaghtan, Torlough O'Carolan, Teig O'Naghten, Brian MacGiolla Meidhre (whose "Midnight Court" is one of the most remarkable pieces in Modern Irish), Timothy O'Sullivan (Tadhg Gaolach), Donough MacConmara, Egan O'Rahilly, Owen Roe O'Sullivan, and in the beginning of the nineteenth century Anthony Raftery, the blind poet of Killeadan.

In the nineteenth century even poetry ceased to be much written in Ireland, and the native language fell into disuse for literary purposes. Only in very recent years has a movement been set on foot to restore the language to general use and to revive Irish literature. An organized effort is being made to bring this about, and Irish books and periodicals are being published in large numbers every year.

Two societies have been especially active in the revival: the Society for the Preservation of the Irish Language, which has long labored to get more recognition for Irish in the schools; and the Gaelic League, a very large organization, which has lately waged a lively popular campaign all over the country. Dr. Douglas Hyde (q.v.), the president of the league, has been one of the leaders in the movement. Among others who have borne an important share in the work should be mentioned the late Father Eugene O'Growney and Fathers P. J. Dinneen and Peter O'Leary, who have contributed largely as authors and editors to the publications of the league.

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A Text Book of Irish Literature (2d ed., 2 vols., ib., 1910) is an excellent manual. Other works of importance are D'Arbois de Jubainville, *Essai d'un catalogue de la littérature épique de l'Irlande* (Paris, 1883); *Cours de littérature celtique* (12 vols., ib., 1883–1902); Nutt and Meyer, *The Voyage of Bran* (2 vols., London, 1895–97); Hull, *The Cuchullin Saga* (ib., 1898); Joyce, *Social History of Ancient Ireland* (2 vols., ib., 1903); Sigerson, *The Bards of the Gael and Gall* (Dublin, 1906); *The Cattle Raid of Cualnge* (*Tain bo Cuailnge*), *an Old Irish Prose Epic* (Eng. trans. by Faraday, London, 1904; Ger. trans. with text by Windisch, Leipzig, 1905; Fr. trans. by D'Arbois de Jubainville, Paris, 1907); Strachan, *Stories from the Táin* (Dublin, 1908); *Old Irish Paradigms and Glosses* (ib., 1909); Rolleston, *The High Deeds of Finn* (New York, 1911); *Myths and Legends of the Celtic Race* (ib., 1911); Hull, *The Poem-Book of the Gael* (Chicago, 1913). For other translations from the Gaelic of this and later periods, see bibliography below under *Irish Literature in English.*

OLD IRISH. Stokes and Strachan, *Thesaurus Palæhibernicus*, part i (Cambridge, 1902; vol. ii, 1904). The completed work will contain all the Old Irish monuments. Meyer, *Selections from Ancient Irish Poetry* (London, 1911) deserves to be mentioned.

MIDDLE IRISH. Stokes and Windisch, *Irische Texte* (4 vols., Leipzig, 1881–1909); O'Grady, *Silva Gadelica* (2 vols., London, 1892). Numerous texts have appeared in the *Revue Celtique* (Paris), the *Zeitschrift für Celtische Philologie* (Halle), the *Anecdota Oxoniensia*, Leahy, ed. (Oxford); *Heroic Romances of Ireland, translated into English Prose and Verse* (2 vols., London, 1905), and also in the publications of the Royal Irish Academy, the Irish Archæological Society, the Celtic Society, and the Irish Texts Society; Meyer, *Colmán mac Lúacháin*, in the "Todd Lecture Series," vol. xvii (Dublin, 1911); and Dottin, *Manuel d'irlandais moyen*, vol. ii (Paris, 1913), containing texts, glossary, and bibliography, are among the most important of recent works.

MODERN IRISH. Atkinson's edition of Keating, *Three Shafts of Death* (Dublin, 1890), is the best introduction to the modern language. Keating, *History of Ireland*, is being edited by D. Comyn for the Irish Texts Society (3 vols., London, 1901–08). Brooke, *Reliques of Irish Poetry* (Dublin, 1789), Hardiman, *Irish Minstrelsy* (London, 1831), O'Daly, *Poets and Poetry of Munster* (Dublin, 1850), and *The Irish Language Miscellany* (ib., 1876), represent the poetry of the last two or three centuries. Several poets of this period have been published very lately in the "Irish Texts Series" of the Gaelic League. Douglas Hyde's *Songs of Connacht* form also an important collection. In folklore the collections of T. Crofton Croker, Jeremiah Curtin, Patrick Kennedy, William Larminie, D. O'Foharta, and Douglas Hyde all deserve mention. For a good general bibliography, the *Esquisse d'une histoire des études celtiques* of Tourneur (Liége, 1905) is recommended. Monahan's *Nova Hibernia, Irish Poets and Dramatists of Today and Yesterday* (New York, 1914) contains studies of recent Irish poets who write in English.

II. **Irish Literature in English.** Side by side with the expiring Gaelic a new Irish literature in English began to make its appearance at the close of the eighteenth and the beginning of the nineteenth century—a literature distinctively national, though not in the native language, and standing quite apart from the imposing stream of English literature by which it flowed. This new Irish-English literature opened with songs and popular ballads, some of which sang of the sorrows of Ireland and breathed a passionate patriotism, while others were idylls of peasant love, or verses convivial or humorous. "The Boyne Water," "The Wearin' o' the Green"—a fine street ballad which is now the national anthem—"The Shan Van Vocht," "The Cruiskeen Lawn," and "Irish Molly O," are good examples of the early attempts at making the English language the vehicle of Irish feeling. Along with the popular literature of ballad and song which belonged to peasants and ragged street minstrels there went a more sophisticated sort of verse which belonged to the drawing room and found its most characteristic expression in the poetry—high and fine at moments, though in general facile and artificial—of Thomas Moore's *Irish Melodies* (1807), *National Airs* (1815), and other poems. In this period Gerald Griffin (1803–40), gratefully remembered for his "Eileen Aroon" and a little sheaf of lovely poems, was writing; and also "Father Prout" (Francis Sylvester Mahony, 1804–66), whose "The Bells of Shandon" still chime through uncounted anthologies. Dashing and racy verse was coming, too, from the pen of William Maginn; and Lever and Lover occasionally threw off such prime comic songs as the former's "The Widow Malone" or the latter's "The Widow Machree."

Contemporary with a part of the productions just mentioned were the beginnings of the literary movement of the Young Irelanders who were banded together under the banner of the *Nation*, the paper which, founded in 1842 by Charles Gavan Duffy, Dillon, and Thomas Davis, quickened the intellect and stirred the heart of Ireland and made the written word a power in the land. Around it sprang up a band of poets, conspicuous among them Thomas Davis (1814–45), Thomas D'Arcy McGee (1825–68), Denis Florence McCarthy (1817–82), Lady Wilde ("Speranza," c.1820–96), and Joseph Sheridan LeFanu (1814–73), who must always have a conspicuous place in Irish literary history. Their work was sincere, fiery, and strong in the rhetorical qualities of poetry—rhythm, phrase, and picturesque diction. But their importance is rather practical and political than strictly literary. Their art was subservient to ideals of nationality and patriotism, and the insatiable artist was often a stranger among them. The artist was, however, potent in James Clarence Mangan (1803–49), a fragile and tremulous spirit in the world of affairs, but, by virtue of some 20 or 30 splendid lyrics, unsurpassed among Irish poets of his own or a later day. In his poems of Gaelic theme and inspiration, and in the like poems of two of his contemporaries, J. J. Callanan (1795–1829) and Edward Walsh (1805–50), we have what is in a manner the prelude to a chorus of Irish poets who in the latter end of the nineteenth century were to constitute a part of a second literary movement. Sir Samuel Ferguson (1810–86) carried on the work of the three men last named and powerfully influenced the course of Irish poetry. His

Lays of the Western Gael (1867) may be regarded as the definite point of departure of the Celtic movement, and the poems of his which made free of the material of the old Irish sagas opened up a new poetic realm, abounding in fresh subjects and new impulses, of which later poets both Irish and English—and Tennyson among them—were to make good use. The Fenian and agrarian movements had their singers, but they were perhaps not of an importance that demands attention for them here. During the two movements just named, however, two other poets, who, like Ferguson, stood rather apart from politics, produced poetry of a rare and finished beauty. The reference is to Aubrey de Vere (1814–1902) and William Allingham (1824–89).

In fiction Irish genius was uninterruptedly at work, from end to end of the nineteenth century, on stories native both in style and in substance. The first of these was Maria Edgeworth's tale of the devil-may-care pre-Union gentry, *Castle Rackrent* (1800), the best thing that ever came from her pen, and a little masterpiece in its kind, which was followed by three other Irish novels, *Ennui* (1809), *The Absentee* (1812), and *Ormond* (1817). Miss Edgeworth wrote from the point of view of the Anglo-Irish Protestant gentry, and so did her fellow novelists W. H. Maxwell (1792–1850); the prolix Lady Morgan (?1777–1859); Samuel Lover (1797–1868); Charles Lever (1806–72); William Maginn (1793–1842), whose stories and sketches present the traits of the convivial Anglo-Irishman; T. C. Croker (1798–1854), the historian of the fairies; and the worthy Anna Maria Hall (1800–81), whose pictures of Irish life are thrown out of focus by her zeal for moral and social edification. Of this group Lever and Lover are the best—and the former is best represented by *Harry Lorrequer* (1839), *Charles O'Malley* (1840), and *Jack Hinton* (1843); the latter by *Rory O'Moore* (1837) and *Handy Andy* (1842), novels in which the Irish peasant is to the fore. Lever, in his comic extravaganzas of sparkling fun and irrepressible high spirits, is well-nigh incomparable among novelists, and Lover is a droll of no mean quality; but a taste for burlesque, caricature, and exaggeration has left their pictures of Irish life and character both misleading and distorted. Contemporary with these novelists who wrote in the spirit of the Anglo-Irish gentry worked a little company of novelists who wrote in the spirit of the peasantry and were themselves of Celtic stock and Catholic faith. This group includes John Banim (1798–1842) and Michael Banim (1796–1874), who collaborated in *Tales of the O'Hara Family* (1825–32); Gerald Griffin (1803–40), whose tale of middle-class, Catholic life, *The Collegians* (1829), is among the best of Irish novels; and William Carleton (1798–1869)—who turned Protestant, be it said by the way—the most gifted of them all, and now unduly neglected by a generation unaware how moving, graphic, and richly humorous are his *Traits and Stories of the Irish Peasantry* (1830), *Fardarougha, the Miser* (1839), etc. In his stories, beyond those of any other novelist, one comes to know the Irish peasant as he was in truth and reality. The years between the Irish story-tellers of the first half of the nineteeenth century of whom we have just spoken and those of whom we are to speak presently as a part of a new literary movement, were not inactive ones and witnessed the appearance, notably, of Joseph Sheridan Le Fanu's *Uncle Silas* (1864) and other sensational but fine novels; of Charles James Kickham's *Sally Cavanagh* (1869) and *Knocknagow* (1879); of Emily Lawless's *Hurrish* (1886); and of William O'Brien's *When we Were Boys* (1890).

During—and beyond—the period embraced in the foregoing brief survey of Irish poetry and fiction in the English language Ireland was by no means lacking in writers who distinguished themselves in other fields—in science, in history, in the essay, in the drama, in philosophy, and in scholarship—witness such names as Tyndall, Lecky, Dowden, Oscar Wilde, Bernard Shaw, and Professor Mahaffy; but their work, as well as that of other Irishmen in these fields, is so much a part of English literature, and has been so carefully treated in the article ENGLISH LITERATURE and under the names of the individual authors, that it is unnecessary to treat them here; nor, for a like reason, is it necessary to consider under this head such Irishmen as Congreve, Swift, Goldsmith, and Sheridan, who, discover in them as we may certain inalienable Celtic traits, have still fully identified themselves with the literature of the sister island.

With the passing of the writers of '48 literary activity in Ireland steadily declined, and was at the lowest ebb just before the fall of Parnell. After his fall part of the national energy which had been absorbed in politics turned once more to literature. In quick succession young writers began to make their appearance with plays and poems, novels and stories, essays and translations from the Gaelic. In 1899 the Irish Literary Theatre was founded in Dublin, and in 1892 the National Literary Society. By the last decade of the nineteenth century the activities of these young writers, known as the Irish Literary Revival, constituted the most interesting literary movement of its day, and one conspicuous in a time of confused ideals for the clarity and solidarity of its aims. While national in spirit and drawing inspiration from the past and present of Ireland, this movement took various forms and directions.

One band of young writers went for their material to the cycles of Gaelic romance and delighted to reveal to their own day, in the form of lyric, narrative poem, or drama, the beauty and glamour of the ancient creations of the Celtic imagination. In the forefront of these was William Butler Yeats (1866–   ), on the whole the representative man of the revival, who was a part of almost every phase of it, and its chief apologist as well. His best work is found in *Poetical Works* (1912), *Plays* (1912), and *Ideas of Good and Evil* (1903). Among lyric poets who wrote in English he was probably unsurpassed in his generation. Other poets who, like Yeats, used the materials and personages of the Irish sagas as vehicles for their own thought and feeling were Dr. John Todhunter (1839–   ), Nora Hopper (Mrs. W. H. Chesson, 1871–1906), and William Larminie (1850–1900). Work good in itself and a boon to original poets and dramatists was done by a number of translators who put into English the Gaelic romance and folklore that were the driving force of the literary awakening in Ireland. First among these was Lady Augusta Gregory, whose *Cuchulain* (1902) and

Gods and Fighting Men (1904), translations in the Irish idiom from the cycles of Irish romance, are likely to float Gaelic romance down the centuries as Malory did the romances of King Arthur. Among the translators may also be mentioned Dr. Douglas Hyde (1860–) and T. W. Rolleston (1857–). Religious poetry, as might be expected in the Isle of Saints, had its place in the revival, and is represented, notably and variously, by Lionel Johnson (1867–92), in point of strength and finished art hardly surpassed by any of his fellow singers; in G. W. Russell ("A. E.," 1867–), mystic and pantheist, also a finished artist, and in Katharine Tynan-Hinkson (186 –), like Lionel Johnson in being a Catholic poet, though in other ways unlike enough. Still another band of poets—and a very engaging choir they make—sings of the joys and sorrows of peasant life in verses of tender pathos or rich and mellow humor, and among them must be mentioned Alfred Percival Graves (1846–), "Moira O'Neill" (Mrs. Walter Skrine, ?–), and Jane Barlow (1857–).

No feature of the revival was more conspicuous than its dramatic activity, to which, notably, Yeats, Edward Martyn (?–), George Moore (1853–), Douglas Hyde, Lady Gregory, and, by no means least, John Millington Synge (1871–1909) contributed. Synge's *Playboy of the Western World* (1907) represents the climax of dramatic success reached by the dramatists of the revival. Like George Moore drawn into the movement by Yeats, Synge was an outstanding figure among the Irish writers, and his death was an irreparable loss. His plays, poems, and miscellanies are collected in his *Works* (4 vols., Dublin, 1910). The plays of the young Irish dramatists, and their philosophy of the drama, of acting, and stage effects were in practical protest against the shabby ideals of the commercialized theatre—a protest that had its effect, thanks to the talent of its dramatists and actors, to the critical resource of its apologists, and to the successful visits to England and America of the Irish Players.

The revival was fertile in novels and produced some books of excellent quality in this kind. Standish O'Grady (1846–) offered tales of the mythic Irish past of an epic sweep and with a kind of bardic afflatus. Jane Barlow, mentioned also above, could fill appealing stories with genre pictures of peasant life in the west. Life in the north was the field of Seumas Mac Manus (1868–) and of Shan Bullock (1865–). In *Luke Delmege* (latest ed., 1901) and *My New Curate* (1899), Canon P. A. Sheehan (1852–1913) presented pictures of the Catholic priesthood of Ireland and of Irish life at its points of contact therewith in novels that are a little provincial and prolix, but on the whole interesting and informing. Two collaborating ladies, Miss Somerville (?–) and Miss Violet Martin ("Martin Ross," ?–), have added to the gayety of English-speaking peoples in stories highly spiced with "divilment and divarshion," somewhat in the manner of Lover and Lever. Perhaps the best of their books is *The Experiences of an Irish R. M.* (latest ed., 1910). George Moore, whom Yeats and Edward Martyn lured back to Ireland to help with the Irish Theatre, stands high among the novelists. Though bred a Catholic, Moore avows his strong anti-Catholic bias in the absorbing short stories of his *Untilled Field* (1903) and in his novel *The Lake* (1906), both of which were a result of his return to Ireland, as were also the three volumes *Ave*, *Salve*, and *Vale* which composed the trilogy entitled *Hail and Farewell* (1914). The last-named work is Moore's account, frank to the limits of indiscretion, of his decade's experience with the revival. It includes, in its wonderful portrait group, sketches from the life, not always flattering and sometimes far from good-natured, of most of the writers prominent in the literary activities of Dublin within the period covered. It should be read by all who would look behind the scenes of this literary movement, but somewhat discounted on the score of its whimsicality and unbridled satire. Finally we may mention the Rev. James Owen Hannay ("George A. Birmingham," 1865–), canon of St. Patrick's Cathedral, whose *The Seething Pot* (1905) and other novels concerned with the men and movements of his day invite the attention of every one who would know how faithfully and skillfully Irish life is reflected in Irish fiction, and we may name also James Stephens, whose *Crock of Gold* (1913), a prose fantasy, and *Demi-Gods* (1914) have found enthusiastic admirers.

Bibliography. Bibliographical and other information regarding most of the authors named above is given elsewhere in these pages under the name of each author. For criticisms and selections from Irish poetry in English, consult *A Book of Irish Verse* (London, 1895), edited, with an excellent introduction, by W. B. Yeats, and *The Treasury of Irish Poetry*, admirably edited by Stopford A. Brooke and T. W. Rolleston (ib., 1900). *Irish Literature* (10 vols., Philadelphia, n.d., but c.1904) is an anthology of prose and verse, editorially uneven and bibliographically unsatisfactory, but with some excellent critical articles, by Yeats, Hyde, Sigerson, and others. H. S. Krans, *Irish Life in Irish Fiction* (New York, 1903), is a careful study of Irish fiction from 1800 to 1850; id., *W. B. Yeats and the Irish Literary Revival* (New York, 1904), is a critical study of Yeats and a survey of the movement indicated in the title. Studies of the Irish Theatre and of the younger Irish dramatists are: Francis Bickman, *Synge and the Irish Dramatic Movement* (New York, 1912); C. Weygand, *Irish Plays and Playwrights* (ib., 1913); Maurice Bourgeois, *Synge and the Irish Theatre* (London, 1913); Lady Gregory, *Our Irish Theatre* (New York, 1913). Yeats's *Ideas of Good and Evil* (London, 1903), a volume of essays, and prefaces and introductions to various volumes of selections of Irish prose and verse of his editing, will be found informing. George Moore's *Hail and Farewell* (3 vols., New York, 1911–14), mentioned above, is of especial importance.

IRISH LORD. A yellowish, sculpin-like fish (*Hemilepidotus jordani*) of the waters about the Aleutian Islands, which is of great importance as food to the Aleut islanders. This is also known as yellow sculpin, and a more southerly species of the same genus is called red sculpin. Both are mottled or barred blackish and are from 1 to 2 feet in length.

IRISHMEN, Society of United. See United Irishmen, Society of.

IRISH MOSS. An edible seaweed. See Carrageen.

IRISH MOSS GUM. See Gums.

IRISH MUSIC. See Celtic Music.

IRISH PALE. See English Pale; Ireland, *History*.

IRISH POM'PANO. A West Indian food fish (*Gerres olisthostomus*), one of the mojarras (see Mojarra), and also called mutton fish.

IRISH SEA. The almost circular middle expansion of the channel separating Ireland from Great Britain (Map: Europe, C 3). It connects with the Atlantic Ocean to the north by North Channel between southwest Scotland and northeast Ireland, and to the south by St. George's Channel between Wales and south Ireland. Its greatest width is 140 miles, and its length from north to south is nearly the same. It contains the Isle of Man in the north central part, and Anglesey in the southeast. The east half is shallow, and the Isle of Man belongs therefore to Great Britain rather than to Ireland, but the western half is a northward extension of the relatively deep St. George's Channel.

IRISH TERRIER. See Terrier.

IRISH TEXTS SOCIETY. A society formed in London in 1898 to promote and foster the study of ancient Irish texts and to undertake their publication. In 1914 some dozen volumes had appeared under this society's imprint.

I'RIS ROOT. The fragrant root of various species of *Iris*. See Orris Root; Iris.

IRISSON, ē'rē'sôN', Maurice Hérisson, Count of. See Hérisson, Maurice.

IRI'TIS (Neo-Lat., from *iris*, iris). Inflammation of the iris. The objective symptoms of iritis (those which can be observed by the physician) are: 1. Redness of the eye, arising from vascularity of the sclerotic around the cornea and general redness of the sclerotic from accompanying conjunctivitis. 2. Change in the color of the iris. When there is an exudation into the iris, a gray or blue eye is rendered greenish, while in a dark eye a muddy reddish tint is produced. The brilliancy of the color of the iris also disappears. When the inflammation is very violent, or has been unchecked by remedies, suppuration may take place, the pus settling at the lower part of the anterior chamber. 3. Irregularity, sluggishness, and sometimes immobility of the pupil, produced by the adhesion of the back of the iris to the crystalline lens. The subjective symptoms (those of which the patient is conscious) are intolerance of light, dimness of vision, pain in and around the eye, and lachrymation. The disease is often confused with acute catarrhal conjunctivitis. Many acute cases recover under treatment in a few weeks; others run a more mild but chronic course. Complicating inflammation of the deep portions of the eye increases the danger. Iritis may be followed by adhesions between the iris and lens, occlusion of the pupil, glaucoma, and sometimes blindness. Iritis may be primary, or secondary to inflammation of other portions of the eye. The primary cases are often caused by syphilis, rheumatism, injury, or, less frequently, by tuberculosis, gonorrhœa, acute infectious diseases, or diabetes. In the so-called idiopathic iritis no cause is found. The treatment consists in absolute rest of the eye, with protection from light, the application of moist, warm compresses, local bloodletting, and dilatation of the pupil by the instillation into the eye of a weak solution of sulphate of atropine, with the view of preventing adhesion of the iris, or of breaking, or, at all events, of stretching and elongating, any adhesive bands that may be formed; and thus of preventing any impairment of the movements of the iris, and any irregularity of the pupil after the inflammation shall have abated. When this is done, the result must be carefully watched by the physician. Constitutional treatment must be directed to the cause of the inflammation, especially in cases of syphilitic origin. See Eye, Diseases of the.

IRKUTSK, ēr-kōōtsk'. A governor-generalship and a government of east Siberia. The former comprises the governments of Irkutsk and Yeniseisk (q.v.), and the Territory of Yakutsk (q.v.), with a total area of nearly 2,792,289 square miles, and a population in 1912 of 2,011,300 (Map: Asia, N 3). The Government of Irkutsk is bounded by the Territory of Yakutsk on the north, the territories of Yakutsk and Trans-Baikalia on the east, China on the south, and the Siberian Government of Yeniseisk on the west. Area, about 280,429 square miles. Its surface is generally mountainous. The Sayan Mountains run along the southern boundary; the Baikal Mountains along the west shore of Lake Baikal. The chief rivers are the Lena, which rises in the Baikal Mountains, and the Angara, with its numerous mountain tributaries. Irkutsk takes in a large portion of Lake Baikal. The mountains of Irkutsk are rich in minerals, containing deposits of iron, coal, graphite, salt, gold, and many varieties of precious and semiprecious stones, including great deposits of lapis lazuli and malachite. The climate is raw and severe, the annual average temperature at the capital being about 32° F. Only an insignificant portion of the cultivable land has been cleared, by far the larger part of the country being covered with forests, filled with fur-bearing animals. The land is fertile and yields ample crops of rye, wheat, oats, barley, buckwheat, and potatoes. The raising of domestic animals is confined mostly to the natives. The manufacturing as well as the mining industries are developing rapidly, and each year brings a remarkable increase in the wealth and population of the province. The manufactures, mainly centred at the city of Irkutsk, include flour milling, pottery, glass blowing, and iron smelting and working. The Baikal fisheries are important. The population (714,900 in 1912) consists mostly of Russians, Buriats, Tunguses, and Jews. Capital, Irkutsk (q.v.).

IRKUTSK. The capital of the Governor-Generalship and of the Government of Irkutsk, and the finest city of Siberia, situated at the confluence of the Irkut with the Angara, 40 miles north of the south extremity of Lake Baikal and 3385 miles by rail from Moscow (Map: Asia, M 3). It was almost entirely rebuilt after the destructive fire of 1879, and is now a handsome, well-laid-out city, with well-paved, wide streets, and all the essential features of a modern city. The climate is healthful, owing to the high altitude of the city; the winters, however, are severe. There are in Irkutsk a theatre, a library, a museum, a school of medicine, and numerous other primary and secondary schools, a meteorological station, and a branch of the Imperial Geographical Society. The cathedral, the seat of an Orthodox archbishop, dates from 1718, and is a fine stone building with five domes and a clock tower in the Russian style. The Roman Catholics and Lutherans have also fine places of worship. The manufactures are unimportant and go mostly to satisfy domestic demands. The commerce is of great importance, Irkutsk being one of the chief centres of the Russian tea trade as well as one of the principal stations on the Trans-Siberian Railway. Each year an important fair is held in December which attracts merchants from all over Siberia and from Russia. On the left bank of the Angara lies the rapidly growing suburb of Glaskovsk, which contains the railroad depot and is connected with the city proper by a bridge of boats. Pop., 1911, 108,060, including over 5000 exiles. Some 45 miles to the northwest lies the village of Alexandrovskoi, which contains the great Central Prison of Siberia. Irkutsk was founded by Cossacks in 1653, created a town in 1686, and soon became the centre of the Russo-Chinese tea trade.

IRMINUS, ĕr′mĭ-nŭs (AS., exalted). The divine ancestor of the Germanic Hermiones, probably identical with Tiw or Tyr. The Saxons erected in his honor great tree trunks, the so-called Irminsûli, e.g., at Scheidungen, after the defeat of the Thuringians, and at Eresburg, Westphalia. The latter, which was looked upon as the national shrine, was destroyed by Charles the Great in 772. See HERMIONES.

IRNERIUS, ĕr-nĕ′rĭ-ŭs, or **GUARNE′RIUS** (c.1050–c.1130). An eminent Italian jurist, founder of the so-called School of Glossators. (See GLOSS.) He was born at Bologna. When quite young, he taught, in his native city, dialectics and rhetoric, but soon devoted himself entirely to the study of the Justinian Code, probably in Rome, where he also seems to have lectured on law. In or about 1084 he returned to Bologna and there established a new law school. He held an Imperial office under Henry V in the early part of the twelfth century. His most important work is the *Summa Codicis* (first ed. by Fitting, 1894), formerly attributed to Placentin. Consult Fitting, *Die Anfänge der Rechtsschule in Bologna* (Berlin, 1888).

IRON (AS. *īren*, *īsern*, Goth. *eisarn*, OHG. *īsarn*, *īsan*, Ger. *Eisen*, from OIr. *iarn*, Welsh *haiarn*, Corn. *hoern*, Bret. *hoiarn*, iron; possibly connected ultimately with Lat. *æs*, Goth. *aiz*, OHG. *ēr*, Ger. *Erz*, bronze, AS. *ār*, Eng. *ore*, Skt. *ayas*, metal). The most abundant and useful of the metals. Unlike many of the common metals, iron is found only rarely in the native state. Nordenskjöld found it, embedded in basalt rocks, in masses of several tons each, in Greenland. Some native iron has also been found in Cañon Diablo in Arizona. Further, metallic iron has been found in meteorites, which proves the existence of the element in extraterrestrial regions. Spectroscopically iron has been found in many of the stars, and Angström has fully demonstrated its existence in the photosphere of the sun. Combined with oxygen and other elements, iron is widely distributed as a constituent of rocks and forms extensive deposits in many parts of the world.

Early History. Articles of stone, bronze, and iron have been found together on the site of the Swiss lake dwellings, but the most ancient specimens of iron at present known come from Egyptian and Assyrian ruins. There is in the British Museum a piece of iron taken from the Pyramid of Gizeh, which is believed to date from about 4000 B.C., and also an axe head of Egyptian manufacture dating from 1370 B.C. Though the earliest pieces of iron now known came from Egypt, it is thought that probably the Assyrians were the first to use the metal freely in the manufacture of tools, weapons, and ornaments. Numerous samples of iron implements dating from 800 B.C., and including the fragment of a saw 44 inches long, were obtained from the ruins of Nimrud. In India the famous iron pillar at Kutub, near Delhi, standing 22 feet aboveground and weighing about 6 tons, dates from 400 B.C. It was made by welding disks of metal together, indicating a remarkable degree of skill on the part of those early ironworkers.

The Greeks were familiar with the uses of iron at least 600 years before the Christian era, although the metal was very scarce. It was not until the Roman Empire was fairly established that the use of iron became general over civilized Europe. The Romans made both wrought iron and steel, using the latter metal for swords and other edged implements. The ancient Britons at the time of the invasion of Britain by Julius Cæsar (55 B.C.) were found to use swords, spears, hooks, and scythes of iron, indicating a familiarity with the metal for a considerable period previous. During the Roman occupation iron manufacture was vigorously developed, and in the succeeding Saxon age it seems also to have flourished. After the Norman Conquest little attention was paid to iron manufacture in England. In Germany, however, the art flourished vigorously, iron implements being exported to other countries in considerable quantities. Until about the middle of the fourteenth century all iron was produced by the direct process, the product being wrought iron or steel, as the case might be, according to the details of the process. About 1350, however, cast iron began to be made in Germany, and the beginning of the modern process of iron and steel manufacture was inaugurated.

Iron (symbol, Fe; atomic weight, 55.84), in the chemically pure state, is a silver-white metal that crystallizes in the isometric system. Its specific gravity is from 7.85 to 7.88, and, according to Carpenter's determination of 1908, it melts at 1505° C. (2741° F.). It is the most tenacious of all the ductile metals, and it may be rolled into sheets so thin that the weight of a sheet of given size will be less than the weight of a sheet of paper of the same size. The magnetic properties are well known; it must, however, be observed that if iron is heated above 760° C. (1400° F.) its magnetic properties almost suddenly disappear. Pure iron may be prepared by the prolonged action of a weak current of electricity on a solution containing pure ferrous sulphate and sal ammoniac or sulphate of magnesium (a high temperature and the presence of ammonium citrate are favorable factors), and heating the precipitated metal with a view to freeing it from "occluded" hydrogen and diminishing its brittleness. Another method of obtaining chemically pure iron consists in preparing pure ferric hydroxide by adding ammonia to the solution of some pure iron salt and then heating the hydroxide in a stream of hydrogen gas. Iron and platinum are the only metals that may be welded together immediately, i.e., without the use of any soldering material. With mercury iron refuses to combine directly, the iron amalgam that has been used for electrical machines being made by a somewhat complicated process with the aid of the amalgam of sodium. After being immersed in fuming nitric acid, iron refuses to dissolve in acids; it is said to be in the *passive* state, a condition that is not yet completely understood. Dry air or oxygen gas has no effect on iron. The "rusting" of iron in ordinary atmospheric air is due to the presence of moisture and of carbon dioxide; the fact that rust is invariably found to contain ammonia would seem to indicate that iron reacts chemically with the moisture of the air, combining with its oxygen and setting free its hydrogen, which in the nascent state forms ammonia with the nitrogen of the air. Rusting may accordingly be prevented by covering iron with a waterproof coating or some paint or varnish, or with a coating of some metal like lead, tin, copper, nickel, or preferably zinc.

In agreement with Osmond, it is now generally believed that pure iron can exist in three distinct allotropic modifications, which are referred to respectively as *α-ferrite, β-ferrite,* and *γ-ferrite.* Pure iron at ordinary temperatures is α-ferrite. At 760° C. (1400° F.) it quickly passes into the β-form—a change comparable to the transformation of ice into liquid water at 0° C. (32° F.), although of course β-ferrite is itself a solid. At 900° C. (1652° F.) a second rapid transformation takes place, β-ferrite changing into γ-ferrite; and finally, at 1505° C. (2741° F.), as we have seen, the solid, now γ-ferrite, melts. The changes from α to β and from β to γ ferrite are accompanied by considerable absorption of heat, just as the further change from γ to liquid and just as the melting of ice and all other solids. The specific volumes of α and β ferrite are nearly the same; on the other hand, the change of the β into the γ form is accompanied by a very considerable contraction of volume. That most important property of iron—its capacity for dissolving carbon, not only in the liquid, but also in the solid state—is possessed by only one of the three solid forms, viz., by γ-ferrite. If such a "solid solution" is allowed to cool slowly, its dissolved carbon is enabled to crystallize out in the form of graphite crystals of more or less appreciable size; the result is a soft iron (or rather steel), whose appearance, under the microscope, is quite heterogeneous and rough. If, on the contrary, the solid solution—which is now usually referred to as *martensite*—is cooled rapidly, then any carbon that separates out is in a state of very fine division indeed, the appearance of the metal under the microscope is comparatively smooth and homogeneous, and the metal is hard: we say, the steel has been *tempered.* This is the present-day view of the tempering of steel; in its details, however, the practice of tempering is awaiting much fuller explanation.

The dissolution of carbon in molten iron lowers, as usual, the freezing point (q.v.), and when the molten mass contains as much as 4.3 per cent of carbon, its freezing point is no longer 1505° C., as when it was pure iron, but only 1130° C. (2066° F.). This is the lowest temperature ("entectic point") to which the freezing point of molten iron can be depressed by the addition of carbon. And if heat were abstracted from the liquid, which contains, as stated, 4.3 per cent of carbon, it would begin depositing a mechanical conglomerate of graphite and a solid solution of carbon in γ-ferrite containing 2 per cent of carbon. On cooling, this solid solution would become supersaturated and would deposit some of its dissolved carbon. At 1000° C. (1832° F.) the solid solution would contain only 1.8 per cent of carbon, but, if further cooled from now on, it would deposit, not graphite, as heretofore, but an important carbide of iron having the formula Fe_3C and known as *cementite* (a sort of white cast iron). The separation of cementite, on account of the considerable proportion of carbon in it, would still further impoverish the solid solution, and finally, if cooling were continued, a temperature would be reached (viz., 670° C. or 1238° F.) where metallic iron also would begin separating out, and the solid solution would be gradually decomposed into a conglomerate of cementite and metallic iron. This conglomerate (a sort of gray cast iron) is known as *perlite.* It is designated by this special name because it is always found to contain the same percentage of carbon, viz., 0.8 per cent; it is, however, certain that perlite is not a definite compound but a mechanical mixture.

The Oxides of Iron. With oxygen, iron forms three distinct compounds: ferrous oxide, FeO; ferric oxide, Fe_2O_3; and ferroso-ferric, or magnetic, oxide, Fe_3O_4. *Ferrous oxide,* or rather ferrous hydroxide, $Fe(OH)_2$, may be obtained by adding caustic soda to a solution of ferrous sulphate. It is a white compound readily absorbing oxygen from the air, even if kept under water, and thus changing into ferric oxide; the oxidation causes its color to change gradually from white to green, gray, and brown. It is but sparingly soluble in water, the solution having an alkaline reaction. If boiled with a solution of caustic potash, ferrous hydroxide attacks the water of the solution, setting free its hydrogen and combining with its oxygen to form ferric hydroxide. *Ferric oxide,* in its anhydrous form, is found extensively as hematite. It is prepared artificially, by heating green vitriol, for use as an oil paint for wood, being known as *colcothar.* Ordinary *rouge,* which is used for polishing glass and metals, is artificial ferric oxide reduced to a fine powder. Ferric oxide may be obtained in the form of crystals having a dark-violet color, by heating green vitriol with common salt. If strongly heated, ferric oxide loses its property of readily dissolving in acids and can then be dissolved only in strong acids and only at a high temperature. If heated to a white heat, it loses part of its oxygen and becomes converted into Fe_3O_4, which exhibits marked magnetic properties. The hydrate of ferric oxide, as ordinarily obtained by adding alkalies to solutions of ferric salts, has the composition $2Fe_2O_3.3H_2O$, and is readily soluble in acids. Another hydrate of ferric oxide has the composition $Fe_2O_3.H_2O$ and, like the anhydrous oxide, does not, if heated, readily dissolve in acids. By exactly neutralizing a solution of ferric chloride with alkali, and subjecting the resulting liquid to a process of hydrolysis, ferric oxide may be obtained in aqueous solutions. According to Tribot and Chrétien, a better way to obtain a solution of pure ferric oxide is to subject a solution of ferric chloride to electrolysis in a porous vessel. But, like other colloidal solutions (see COLLOIDS), that of ferric oxide is unstable, and the oxide readily passes from the soluble to the insoluble form. The hydrated forms of the oxide may be converted into the ordinary anhydrous form by the application of a moderate heat; at a certain point of this process the substance suddenly becomes incandescent—showing that a peculiar molecular change is taking place in it—and after that it is found to have lost its property of readily dissolving in acids. The exact nature of the change is still unknown. *Ferric anhydride*, sometimes referred to, is unknown in the free state. It is the hypothetical anhydride of ferric acid, H_2FeO_4, which is likewise unknown in the free state, but certain of whose salts may be readily prepared. Thus, potassium ferrate, K_2FeO_4, may be obtained by heating small pieces of iron with the chlorate of potassium. From the existence of such salts it is evident that, much unlike ferrous oxide, which is distinctly alkaline in reaction, the peroxide of iron acts as a feeble acid. The tendency of peroxidized iron to pass into the stable ferric state is even greater than the tendency of ferrous iron to pass into that state, and hence the ferrates act as powerful oxidizers, readily burning such substances as oxalic acid, readily changing manganous oxide into manganese dioxide, etc.

The Salts of Iron. Corresponding to ferrous oxide and ferric oxide, respectively, are two series of iron salts, ferrous salts and ferric salts.

The action of acids on metallic iron, in the absence of oxidizing agents, causes the formation of ferrous salts, among which deserve mention the sulphate, the sulphide, the chloride, and the oxalate. *Ferrous sulphate*, known as green vitriol, or iron vitriol, is the substance from which the compounds of iron are generally prepared. The sulphate itself is obtained as a by-product in certain industrial processes and may be prepared by the action of sulphuric acid on metallic iron. In its ordinary, hydrated form its composition corresponds to the formula $FeSO_4.7H_2O$. It has a greenish color that is scarcely perceptible when the salt is dissolved in water; the solution readily takes up oxygen, which causes the formation of ferric sulphate, and hence must be kept in sealed vessels out of contact with air, if it is to be preserved unchanged. Two other hydrates of ferrous sulphate are known—a pentahydrate, $FeSO_4.5H_2O$, and a tetrahydrate, $FeSO_4.4H_2O$. Ferrous sulphate is used for a variety of purposes in the arts; it is employed in making fuming sulphuric acid, in dyeing, as a disinfectant, in making colcothar and rouge, etc. With the sulphate of ammonium it forms a stable double sulphate, whose crystals have the composition $Fe(NH_4)_2(SO_4)_2.6H_2O$. *Ferrous sulphide*, FeS, which has been found in many meteoric stones, may be made by heating iron filings with flowers of sulphur. It is largely used in chemical laboratories for the preparation of sulphureted hydrogen, which it yields on coming into contact with dilute sulphuric or hydrochloric acid. *Ferrous chloride*, or rather its hydrated form, $FeCl_2.4H_2O$, may be prepared by the action of hydrochloric acid on metallic iron. The crystalline anhydrous chloride, $FeCl_2$, may be prepared by the action of gaseous hydrochloric acid on red-hot iron. *Ferrous oxalate*, which is a powerful reducing agent, is used as a developer in photography, potassium-ferrous oxalate being used for the same purpose. Another important compound containing iron in the ferrous state is the well-known potassium ferrocyanide, or yellow prussiate of potash, which may be found described under Hydroferrocyanic Acid.

Among the ferric salts deserve mention the chloride, the sulphide, the nitrate, and the phosphate. *Ferric chloride*, Fe_2Cl_6, is a volatile and extremely hygroscopic salt prepared by passing a rapid stream of chlorine over red-hot metallic iron. Its solutions in water have a brown color which is due, not to the ferric chloride itself, but to the formation of basic chlorides of iron and of colloidal ferric hydroxide, which are eventually precipitated out of solutions of ferric salts. Commercial ferric chloride contains a considerable percentage of water and hence contains basic chlorides, probably some free ferric hydroxide, etc. It is prepared by dissolving ordinary ferric hydroxide in hydrochloric acid. Ferric chloride forms four distinct hydrates: a dodecahydrate, $Fe_2Cl_6.12H_2O$; a heptahydrate, $Fe_2Cl_6.7H_2O$; a pentahydrate, $Fe_2Cl_6.5H_2O$; and a tetrahydrate, $Fe_2Cl_6.4H_2O$. Each of these melts completely at a certain temperature: the dodecahydrate at 37° C. (98.6° F.); the heptahydrate at 32.5° C. (90.5° F.); the pentahydrate at 56° C. (132.8° F.); the tetrahydrate at 73.5° C. (164.3° F.). The solubility of these hydrates exhibits an interesting phenomenon: that the solubility of a salt depends upon the form and composition of the crystals used in saturating the solution is now generally understood, so that it is not surprising that at some given temperature two different solutions may be obtained—both saturated—if two different hydrates are used in making up the solution. But with the hydrates of ferric chloride, at certain temperatures, it is possible to obtain two very unequally concentrated solutions—both saturated—by using *one and the same hydrate*. However, this interesting phenomenon is not confined to ferric chlorides, and many other substances are now known to exhibit it. *Ferric sulphide*, FeS_2, occurs in nature abundantly as iron pyrite; it is used for the preparation of sulphurous anhydride in manufacturing sulphuric acid and in bleaching. *Ferric nitrate*, $Fe_2(NO_3)_6$, is obtained by dissolving metallic iron in an excess of cold nitric acid and allowing the solution to evaporate in a vacuum; the crystals thus obtained correspond to the formula $Fe_2(NO_3)_6.9H_2O$, and melt at 35° C. (95° F.). In aqueous solution the nitrate gradually decomposes unless an excess of free nitric acid is present. *Ferric phosphate*, $FePO_4$, is an insoluble white substance formed when acid sodium phosphate is added to solutions of ferric acetate. Another compound containing iron in the ferric state, viz., potassium ferricyanide, may be found described under Hydroferricyanic Acid.

Medicinal Uses of Iron Compounds. Iron itself and a number of its compounds are used in medicine in the form of various preparations; in the stomach all such compounds are converted mostly into ferric chloride and to a small extent into ferrous chloride. One of the best medicinal compounds of iron is ferric chloride, the evil effects of whose strongly acid properties may be avoided by free dilution or by the addition of bicarbonate of sodium. Another way to avoid the undesirable effects of acid compounds of iron is to administer them in the form of coated pills which may pass through the stomach unchanged, the acidity being then neutralized in the alkaline juices of the intestine. The constipating effect of iron compounds is well known, but is generally somewhat exaggerated; this effect may be readily avoided by the use of suitable purgatives. To avoid indigestion, iron compounds should not be taken shortly before or after meals. In the mouth iron salts may (if acid) attack the enamel of the teeth, and by combining with sulphur (from food or the tartar of the teeth) form a black deposit of ferrous sulphide on the teeth and the tongue. For these reasons iron preparations are usually administered through a glass tube, and the mouth is to be carefully rinsed immediately after taking the dose.

Besides constituting the best-known local astringents for external application, iron salts are extensively used as a remedy for many forms of anæmia and the conditions caused by them, the best results being obtained by the use of ferrous sulphate and ferric chloride (the latter together with some glycerin). Iron salts have also been given with success in diphtheria, tonsillitis, and other forms of sore throat, as well as in erysipelas. In anæmia they have the effect of restoring the number of corpuscles and the normal amount of hæmoglobin in the blood. The fact that this takes place was long considered remarkable, since it was believed that no iron is actually absorbed into the system. Late investigations show, however, that both the organic and inorganic forms of iron are so absorbed. The substance has been demonstrated in the thoracic lymph soon after the ingestion of ferric chloride. We have seen above that in the stomach iron salts are transformed into ferric chloride. On reaching the intestine the chloride is transformed into ferric hydroxide, and subsequently the latter is in turn transformed into the black sulphide and tannate of iron, which are voided with the fæces. Most of the iron taken is thus voided, and none passes into the urine. On the other hand, when injected into the blood, even in very moderate quantities, iron salts produce symptoms of poisoning. The question therefore arises: In what manner do iron salts act in relieving anæmia? Definitely this question has not yet been answered. According to a theory advanced by Bunge, the iron normally present in the blood enters it in the form of complex organic iron compounds that are contained in food. That iron in some form or other necessarily enters the blood is evident, if we remember that the amount of iron in the body of a child increases with age. Now, according to Bunge, the alkaline sulphides that may be present in the intestines are capable of depriving the iron compounds of food of their iron, the resulting sulphide being of course incapable of absorption. But if sufficient quantities of iron are taken internally, the alkaline sulphides are decomposed, and the organic iron of the food becomes available. The amounts of iron required depend of course upon the amount of alkaline sulphides in the intestines, and this is why it may be found necessary to administer as much as 18 grains a day to an anæmic woman whose body in a normal state contains altogether about 30 grains. A strong argument in favor of Bunge's theory of the indirect action of iron is found in the fact that manganese, copper, and certain other substances not at all present in the blood are almost as efficient as iron in curing anæmia. An excellent discussion of this long-debated question is to be found in H. C. Sherman's *Chemistry of Food and Nutrition* (New York, 1911).

Ferric chloride, the most important medicinal salt of iron, is usually administered in the form of its tincture, which contains about 3.25 per cent of iron, corresponding to about 9.5 per cent of anhydrous ferric chloride. The tincture is prepared by making up 250 parts of the official aqueous solution of ferric chloride to 1000 parts with alcohol. *Ferric hydroxide with magnesia* is known as "arsenic antidote," being an effective remedy for poisoning with arsenic. The antidote may be best prepared by gradually adding 10 parts of magnesia in water to 50 parts of ferric hydroxide in water and shaking the mixture vigorously. It should be prepared immediately before using and should be given repeatedly in large doses. Iron salts should never be given together with any preparation containing tannic or gallic acid. Besides the preparations mentioned above, several other iron salts and compounds are extensively employed. Among these may be mentioned reduced iron (iron by hydrogen) and the carbonate, iodide, lactate, nitrate, citrate, acetate, phosphate, valerianate, and oxide of iron. A useful preparation for strumous conditions in children is the sirup of the iodide of iron, which combines the tonic effect of iron with the specific action of iodine. Many preparations of organic iron are also used, most of them proprietary medicines, and many of weak or doubtful therapeutic value. See BLAUD'S PILLS.

IRON ORE

The ore minerals of iron, together with their composition and theoretic percentage of metallic iron, are: 1. *Magnetite*, or *magnetic oxide* (Fe_3O_4), with 72.4 per cent iron. 2. *Hematite* (Fe_2O_3), known also as *specular iron ore*, *red hematite*, *fossil ore*, and *Clinton ore*, according to its character, and containing 70 per cent iron. 3. *Brown ore*, consisting usually of limonite ($2Fe_2O_3.3H_2O$), but containing also other hydrous iron oxides, such as turgite, goethite. Other names are *brown hematite*, *bog iron ore*, and *ochre*. The limonite has 59.89 per cent iron. 4. *Siderite* ($FeCO_3$), with 48.27 per cent iron, also known as *clay iron stone*, *kidney ore*, *blackband ore*, *carbonate ore*, and *spathic ore*.

Pyrite (FeS_2) is occasionally used as iron ore after it has been roasted for the recovery of sulphur in sulphuric-acid manufacture. *Franklinite* [$(FeZnMn)O, (FeMn)_2O_3$] is employed in the production of spiegeleisen, after extracting the zinc by roasting.

Composition. The ores of iron rarely approach the theoretic percentage, owing to the presence of common rock minerals in the gangue. The impurities which they supply are alumina, lime, magnesia, silica, titanium, arsenic, copper, phosphorus, and sulphur.

Some of these, like phosphorus, sulphur, and titanium, are especially objectionable. Phosphorus cannot be eliminated in the blast furnace or acid converter used in making Bessemer steel, and for this purpose very low phosphorus ores must be employed, the high phosphorus ones requiring special treatment. Sulphur is undesirable, as it makes the iron brittle.

Titanium, found in many magnetites, renders them difficult to smelt and causes a loss of iron. The carbonate ores are first roasted to free them of carbon dioxide and thus raise the iron contents. Brown ores are similarly improved by washing, and magnetite, if of low grade, by crushing and magnetic separation.

The table on page 364 gives the composition of a number of iron ores.

Classification. The chief types of iron-ore deposits found in the United States are: 1. Magmatic segregation deposits. 2. Contact metamorphic deposits. 3. Sedimentary ores. 4. Ores concentrated by surface waters percolating through the rocks, the ore being deposited as replacements, or in residual materials. 5. Lenticular masses in metamorphic rocks, of variable origin. 6. Gossan ores. For description of these types, see ORE DEPOSITS.

COMPOSITION OF IRON ORES

	I	II	III	IV	V
Fe	60.91	57.44	58.83	31.3	48.54
SiO_2	4.49	.75	6.80	23.98	11.22
P	1.548	....	.062	.24	.38
S	.027	....	.069	SO_3 .987	.09
TiO_2	.03	12.08	.....	.225	....
Cu	.007	....	.....	....	....
CO_2	.....	....	.....	9.60	....
Moist.	.25	....	.....	.26	13.00
Al_2O_3	.....	4.62	2.23	7.26	3.61
Cr_2O_3	.....	.32	.....	....	....
V_2O_3	.....	Trace	.....	....	....
MnO	.....	.28	.816	....	....
CaO	.....	.13	.32	9.15	.84
MgO	.....	2.04	.32	2.92	....

I, magnetite, Mineville, N. Y.; II, titaniferous magnetite, North Carolina; III, high-grade hematite, Mesabi Range, Minnesota; IV, Clinton hematite, New York; V, Alabama brown ore.

Resources of the United States. Iron ores are widely distributed in the United States, and in geologic age they range from Pre-Cambrian to Recent. The relative importance of the different iron ores mined in the United States is shown by the following percentages of the total output for 1913: hematite, about 93 per cent; brown ore, under 3 per cent; magnetite, about 4 per cent; siderite, 0.045 per cent.

A large part of the *hematite* production comes from the Lake Superior region, where vast deposits have been found in metamorphosed Pre-Cambrian rocks. Six important productive belts—or "ranges," as they are commonly called—as well as several smaller districts, are known. The first six are: 1. The *Marquette*, opened in 1856 and situated in Michigan, east of the Keweenaw Peninsula. 2. The *Menominee*, first developed in 1877 and lying on the border of Wisconsin and the upper peninsula of Michigan. 3. West of the Menominee is the *Gogebic*, opened in 1884. 4 and 5. *Vermilion* and *Mesabi* ranges, situated northwest of Lake Superior, in Minnesota. 6. *Cuyuna*, lying southwest of the Mesabi, in Minnesota, and of recent development. The deposits are mostly near the surface, and in the Mesabi, after removing the overburden, the soft granular ore is excavated by steam shovels, which deposit it directly on the cars. A single mine in Minnesota produced, in 1913, 3,457,608 long tons of ore. The total production of the Lake Superior mines up to and including 1913 was 632,728,394 long tons. Most of the ore is forwarded by rail to ports on Lakes Superior and Michigan and thence shipped by boat to Chicago and Lake Erie ports, a large proportion being destined for the manufacturing centres of western Pennsylvania. A great shipping industry is engaged in the transport of Lake Superior ores.

Hematite ore is also mined in many of the Appalachian States, the most important being that found in the Clinton formation of the Silurian, which outcrops along the western slopes of the Appalachians from New York to Alabama. The ore is a true bedded deposit, but owing to its comparatively low grade is not extensively developed anywhere, except in the Birmingham district of Alabama. There it is far removed from other sources of richer ore that might compete with it. In the Western States, notably in the Cordilleran region, there are scattered deposits of hematite and magnetite of the contact-metamorphic type, but they form a reserve source of supply.

Brown ores, chiefly of the residual type, are of importance in the southern Appalachians from Virginia to Alabama.

The *magnetite* ores found in the United States are of three types: 1: *Nontitaniferous magnetites*, found chiefly in a belt of gneissic rocks extending from the Adirondacks to North Carolina and most extensively worked in the former region. 2. *Titaniferous magnetites*, usually associated with igneous rocks of the gabbro type and found at a number of localities in the United States. They are of little or no commercial value at the present time. 3. *Magnetite sands*, of no commercial importance.

The quantity of iron ore shipped from the mines in the United States in 1913 amounted to 59,643,098 long tons, valued at $130,905,558. This, as compared with 1912, represents an increase in quantity of 4.6 per cent and in value of 22.28 per cent. The average price per ton in 1913 at the mines was $2.19. Of the quantity marketed in 1913, Minnesota supplied 60.07 per cent; Michigan, 22.44 per cent; Alabama, 8.38 per cent; and New York, 2.05 per cent. The imports of iron ore in 1913 amounted to 2,594,770 long tons; the exports, 1,042,151 long tons; and the pig iron production, 30,966,152 long tons.

The latest available figures of the production of the important countries are as follows:

COUNTRY	Year	Long tons
United States	1913	61,980,437
Germany and Luxemburg	1911	29,408,812
France	1911	16,376,967
United Kingdom	1911	15,519,424
Spain	1911	8,635,523
Sweden	1911	6,056,868
Austria-Hungary	1911	4,779,851
Newfoundland	1911	1,171,992
Cuba	1913	1,582,431
Algeria	1911	1,057,087
Greece	1911	493,106
Tunis	1911	397,638
Italy	1911	367,900
India	1911	366,180
China	1911	109,542

Foreign Countries. *Oölitic limonites*, which form well-defined and extensive beds in sandstones, shales, and marls of Jurassic age, in Germany, France, and Luxemburg, are of great importance as present and future sources of supply, even though the iron content ranges only from 31 to 40 per cent. In England the *oölitic siderite* of Jurassic age is also very extensively mined, the largest supply coming from Cleveland Hills in the Yorkshire district. Of great importance are the *magnetite* deposits of northern Sweden, probably the largest in the world. At Kiruna the ore body forms an enormous, steeply dipping mass, lying between porphyries. The product of these mines goes chiefly to Germany, and borings have shown a reserve of 480,000,000 tons. In recent years considerable development has demonstrated the existence, in eastern Cuba, of millions of tons of *residual ores*, whose iron content ranges between 40 and 50 per cent. The ore has been derived from the weathering of serpentine, and in the Mayarí district extends, with a thickness of 15 feet, over an area of 10 by 4 miles. Brazil contains large reserves of iron ore in the district of Minas Geraes, some 300 miles from the coast. The ore is chiefly hematite and in its mode of occurrence closely resembles the Lake Superior ores. In British North America *bedded hematites* have been extensively worked in Newfoundland, and *magnetites* and *hematites* in Ontario.

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IRON, GALVANIZED. See GALVANIZED IRON.

IRON, RALPH. The pseudonym of Olive Schreiner (q.v.).

IRON AGE. See GOLDEN AGE; NEOLITHIC PERIOD.

IRON AND STEEL, METALLURGY OF. Native iron in the free or metallic condition is almost unknown, and it is therefore necessary to resort to special processes to extract it from the mineral compounds (see IRON) in which it occurs. These minerals, mixed with varying amounts of foreign or earthy matter, principally sand or clay, and technically known as the *gangue*, constitute the huge ore deposits which are widely distributed over the globe. To be of commercial value the character of the ore, its location with respect to sources of fuel and flux, and its ultimate point of consumption or market must be taken into consideration as well as its content of iron calculated on a metallic basis, i.e., as the element Fe. The most important deposits of the United States are those of the Lake Superior region, which contain from about 49 to 61 per cent of iron, with an average of, say, 55 per cent; the Southern ores (Alabama) are not so rich, their content being about 40 to 50 per cent.

Ores with less than about 30 or 35 per cent can be employed only in special cases, and if below about 40 per cent must generally be concentrated by some operation which will remove as much as possible of the foreign material. The operation may consist in *calcination*, the simple application of heat to drive off (*a*) moisture, (*b*) water of combination if the ores or minerals are hydrated, and (*c*) carbon dioxide in the case of carbonates. *Roasting*, consisting in heating with free access of air (oxygen), is employed to burn off organic matter or sulphur if the ores contain too high a proportion. *Weathering* is for the same purpose and consists in exposing the ore to atmospheric conditions for a long period. *Washing* is an operation to separate substances of different specific gravities which are only mechanically mixed, by forming different layers or strata in a pulsating current of water, the layers being drawn off separately.

Ores in too fine a condition, or which readily crumble, give trouble on account of their tendency to choke up a furnace and so prevent the necessary freedom of passage for the gases through the charge. Much attention has recently been given to methods designed to correct this condition. *Nodulizing* consists in sintering or partially fusing the small particles into large coherent lumps; *briquetting* aims to attain the same end by mixing the ore with some binding substance, such as lime water or molasses, and molding it into bricks which are subsequently burnt hard. The fine material carried out of the furnaces by the blast, known as *flue dust*, has also been similarly treated.

GENERAL PRINCIPLES

Even where concentration is applied, only a partial removal of foreign matter and impurities can be effected. The problem presented to the metallurgist can be broadly divided into:

1. Removal of mechanically intermixed matter and preliminary purification.
2. Reduction to the metallic state.
3. Final purification.
4. Adjusting the composition to secure the desired physical properties.

The first and second processes are generally effected in the blast furnace, while the third and fourth are performed in some purification or steel-making process. In commercial practice all the various processes depend upon reactions taking place at high temperatures, which are nearly always obtained by the combustion of fuel, usually carbon in the form of coal, coke, or charcoal. For certain purposes gaseous fuel or its equivalent is necessary. During the last few years electricity has been adopted to a very limited extent. See *Electrothermic Processes*, below.

In the case of ores part of the carbon in the fuel unites with and removes the oxygen combined with the iron, the latter being thereby reduced to the metallic state, the attraction or affinity of oxygen for carbon at high temperatures being greater than for iron. The gangue is separated by melting, usually assisted by the special addition of material known as *flux*, with which it combines to form a more fusible compound termed *slag* or *cinder*. This is either allowed to run off, or else collects on top of the iron by reason of its lower specific gravity, and an almost perfect separation can be attained in this way. As will be explained more fully later, the slag performs two functions: (1) mechanical—the removal of material chemically inert towards the iron; (2) chemical—a purifying action, more or less perfect, of removing and retaining impurities which would otherwise contaminate the iron.

Five elements are always found in the iron and steel of commerce—carbon, manganese, phosphorus, sulphur, and silicon. The first is derived from the fuel or special additions; the others from the raw materials or special additions. Many others may be present in special cases.

The reduction of iron to the metallic condition can take place at relatively low temperatures—considerably below its melting point—and under such conditions it is in a pasty or spongy condition. Probably the oldest method of procedure was to dig a hole at the top of a hillside, forming a crude fireplace or hearth, which was filled with selected ore and charcoal. It was then covered over, a hole left in the top for the escape of the hot gases, and another at the bottom so that the air could enter and burn the fuel, the prevailing winds being depended upon for the draft. A portion of the iron oxide of the ore combined with the siliceous gangue to form a slag sufficiently fusible to melt and run down to the bottom of the hearth, where it collected and enveloped the mass of pasty iron which had been reduced. A large portion of the slag was subsequently expelled from the interstices of the iron ball or *bloom* by hammering it while hot.

Early improvements consisted in forcing the air in under a slight pressure by means of a crude form of bellows, later replaced by some form of blowing engine, usually operated by water power. This removed the dependency on prevailing winds; hence the furnace could be located wherever most convenient to the supply of raw material. With air under pressure it became possible to increase the height of the charge, and the furnaces were accordingly constructed of stones or bricks, the output being correspondingly increased. The increase in height brought about still another advantage, not at first anticipated. This was an increase in temperature and reduced fuel consumption per unit of iron produced. It was therefore only natural that when these facts were realized the tendency was towards increased size and height of furnace. Finally a point was reached where a sufficiently high temperature was attained to melt the iron, which collected at the bottom, with the much lighter slag floating on top.

The molten iron so obtained differed, however, materially from that produced at lower temperatures in a solid pasty condition, as it could not be worked under a hammer, even when hot, and could be shaped only by pouring it while molten into the desired form. It was therefore called *cast iron* to distinguish it from the variety which could be so worked, hence called *wrought iron*. The reason for this difference was later found to be due, in the case of the cast iron, to the absorption of a considerable amount of carbon from the fuel with which it was in contact, this absorption being directly due to the high temperature and to the strongly reducing conditions. Under such conditions the amount of carbon absorbed cannot be controlled, and the excess responsible for its brittleness must be removed subsequently by some oxidation process if it is desired to restore its malleability. This double treatment for producing wrought iron or steel is called the *indirect* method, to differentiate it from the *direct* method by which only one operation is necessary. The direct method has practically been abandoned except in primitive regions where there is a very limited demand and no real competition. The indirect method, even with its double treatment, is very much less expensive on account of the economy in fuel and particularly in labor and also because cheaper raw materials can be used. Since cast iron is produced in a molten condition, it can be handled largely by gravity and in enormous units by the aid of mechanical equipment. For the latter reasons steel is generally less costly than wrought iron produced from cast iron. By the direct method the material must be worked by hand to be effective, hence in small units, which results in heavy labor charges. The quality of the raw materials must also be better (e.g., charcoal instead of coke), and the loss is much greater.

DIRECT PROCESS

By this method wrought iron or steel (when the percentage of carbon is higher) is produced from the ore in one operation. This process has not been used in the United States since 1901, in which year only slightly over 2000 gross tons were produced. Two classes of product may be obtained according to its intended use: (*a*) wrought iron or steel blooms, to be subsequently forged or rolled into the desired shape; (*b*) spongy iron very low in carbon and, as the name indicates, not welded up into a solid mass, to be used as part of the charge in some steel-making process.

Typical of the first class is the **Catalan Process,** a brief description of which will be given. The furnace proper (see Fig. 1)—or "forge," as it is called—is square or rectangular in cross section and somewhat resembles a large packing box in appearance. It is from 20 to 40 inches wide and from 20 to 32 inches deep, with a height of about 1 to 2 feet. It is usually formed of heavy cast-iron plates which are double and water-cooled to prevent their being overheated and burnt through. The interior of this box or chamber is called the hearth, and being open in front, to permit of charging the raw material and withdrawing metallic iron and slag, is termed an *open hearth*. At the back, about halfway up from the bottom, is the single *tuyère* or pipe, inclining slightly downward, through which the air necessary for the combustion of the fuel is introduced under a moderate pressure. Above this chamber is a stack or chimney for carrying off the waste gases. In the stack is set a pipe in which the air is preheated before entering the hearth, thereby increasing the temperature and correspondingly reducing the fuel consumption. The hearth, initially heated by burning fuel in it or hot from the previous charge, is filled to about the tuyère level with charcoal, upon which

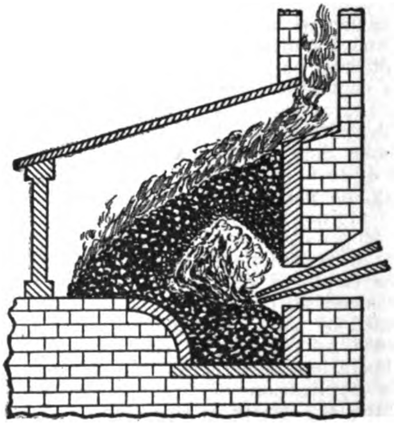
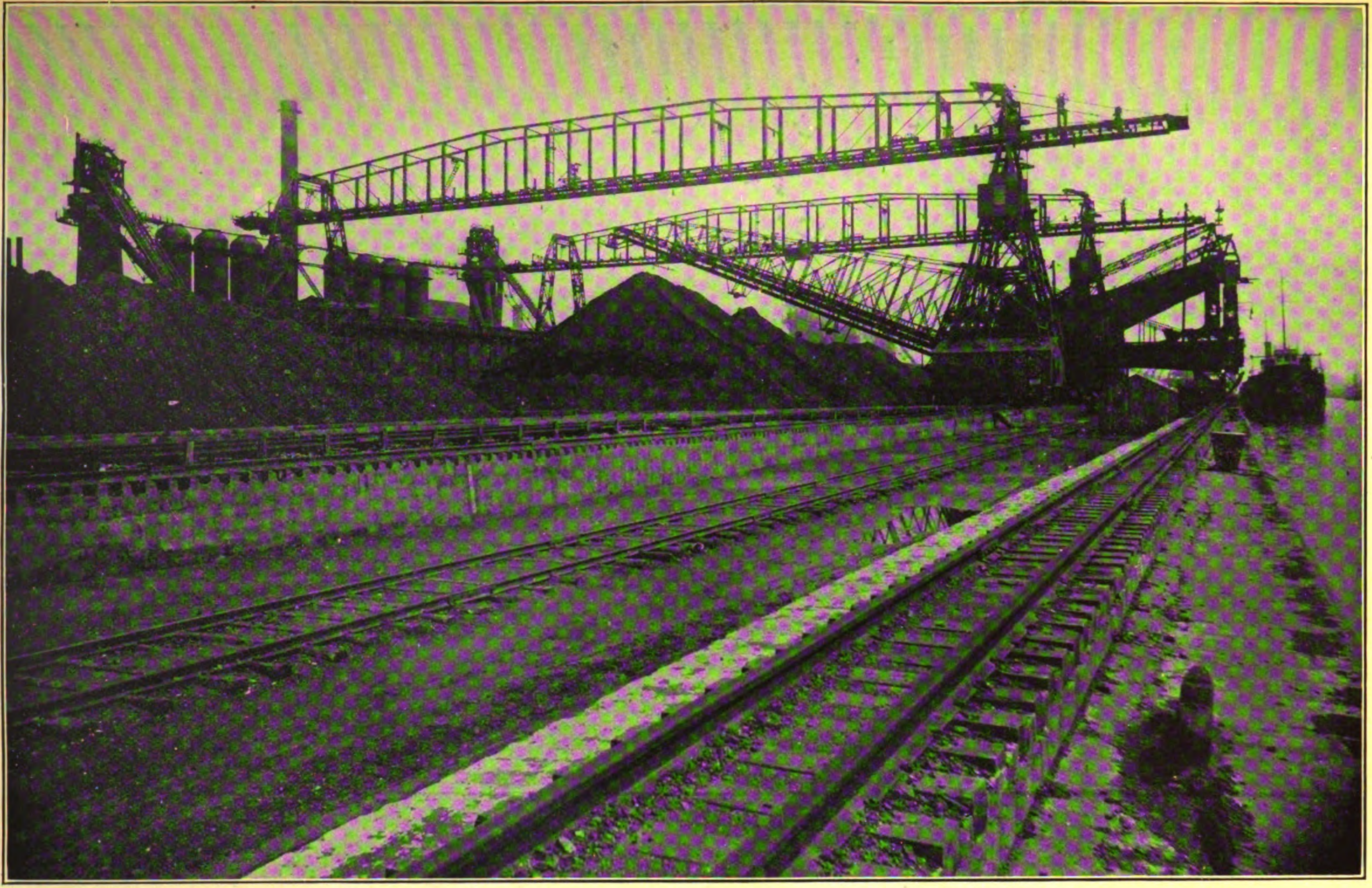
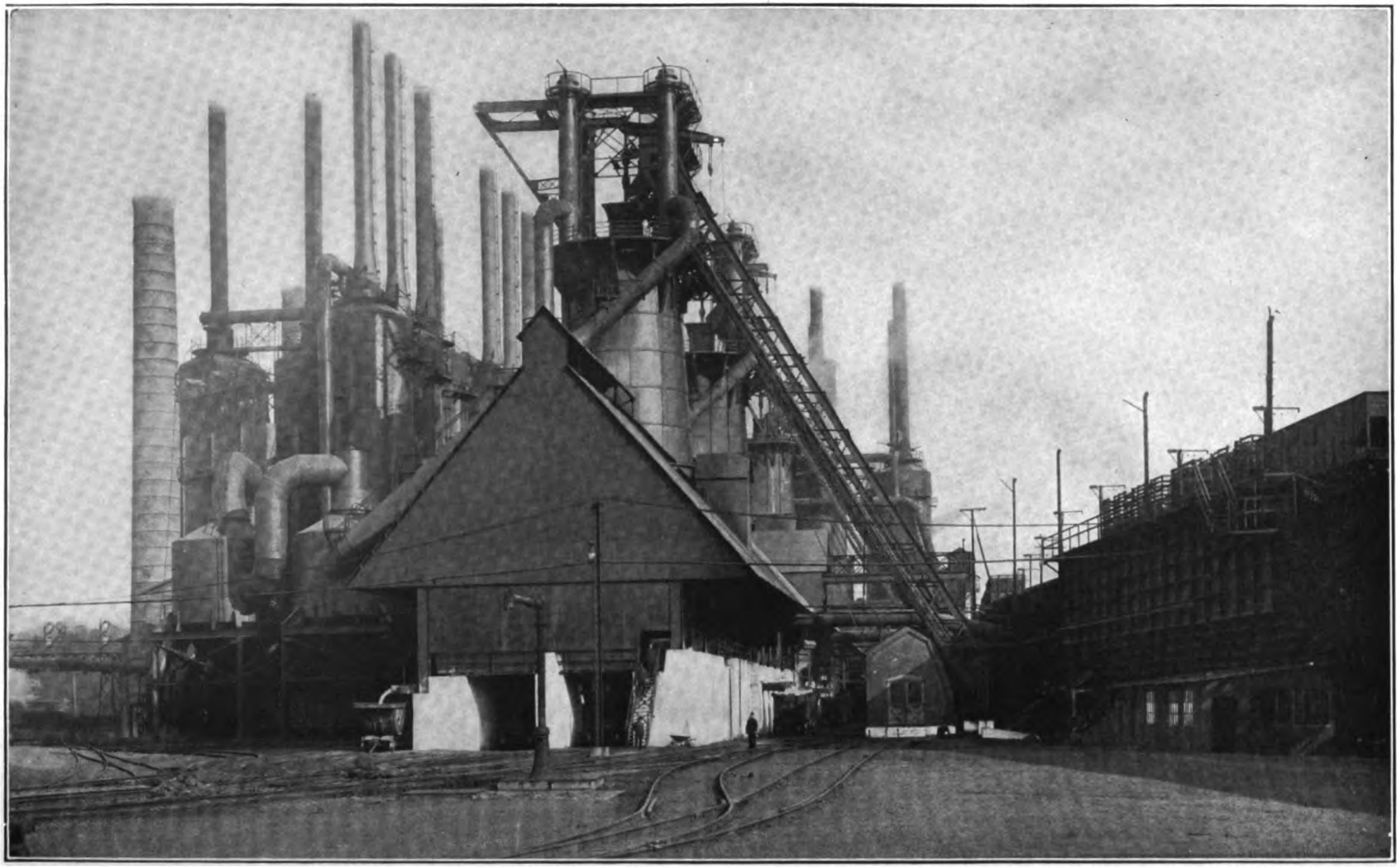


FIG. 1. CATALAN FORGE.



ORE DOCK AND STOCK PILE OF A MODERN AMERICAN BLAST FURNACE PLANT

SHOWING UNLOADERS (RIGHT) AND GANTRY CRANES BY WHICH THE ORE IS TRANSFERRED FROM THE VESSELS TO THE STOCK PILES; (LEFT) BLAST FURNACES AND STOVES. LACKAWANNA STEEL COMPANY



A MODERN AMERICAN BLAST FURNACE PLANT

SHOWING ELECTRIC SKIP HOIST, STOVES, AND DUST CATCHER (LEFT); TRESTLE FOR UNLOADING COKE AND LIMESTONE, AND BINS (RIGHT); (FOREGROUND, LEFT) SLAG RUNNING INTO LADLE. BETHLEHEM STEEL COMPANY are piled small lumps of ore in a separate column, with additional charcoal separating it from the tuyère so that the oxygen of the blast must first pass through the charcoal. The reduction is completed by contact with the solid carbon in conjunction with the high temperature in the neighborhood of the tuyère. As the charcoal burns away and the charge sinks, more ore and charcoal are shoveled on top, until it is judged that a sufficient amount of iron has been produced. A part of the ore is not reduced, but melts and, combining with the siliceous gangue, forms a liquid slag which collects in and around the spongy mass or ball of metallic iron at the bottom of the hearth. This slag, being highly oxidizing and basic, serves to restrain most of the phosphorus from entering or remaining in the iron and also prevents the iron from taking up any considerable amount of carbon from the fuel, the only moderately reducing conditions in the hearth being highly favorable to both of these conditions. Owing to the character of the fuel and ore employed, there is very little sulphur present. The blast is now stopped, and the ball or bloom removed from the hearth and hammered to remove most of the intermingled slag and compact the particles; the latter operation was formerly termed *shingling*. Reheating and hammering may be repeated one or more times, both to remove additional slag and to secure the desired form. With the average size of furnace about 300 to 400 pounds of iron were produced in from four to six hours. The loss of ore was considerable, and the fuel consumption was relatively high.

The **American Bloomary Process** resembles the Catalan in general details, both as regards the process itself and the type of furnace employed. The charge consisted of fine ore and charcoal mixed together (instead of piled separately), and a bloom weighing approximately 300 pounds was obtained in about three hours.

The *stückofen* or *old high bloomary* was a shaft furnace about 10 to 16 feet high, and even more nearly approaching the present blast furnace in its dimensions and operation was *Husgafvel's high bloomary* or *continuous stückofen*, which was about 26 feet high. In the latter furnace the raw materials were charged at regular intervals. While both forms were intended for the production of wrought iron, cast iron was occasionally made owing to the much more pronounced reducing action.

Sponge-Making Processes. The principle of nearly all these processes is to reduce the iron at a comparatively low temperature by means of solid carbonaceous matter mixed with the ore, or else by passing reducing gases through it, sometimes by a combination of both methods. The product was obtained as a spongy mass. The necessary heat was supplied either externally or by the combustion of a portion of the solid carbonaceous matter mixed with the ore, and in some cases in both ways. These processes have also been abandoned, as they were found unable to compete with other modern methods. The best-known processes of this type were Chenot's, Blair's, and the Eames or Carbon Iron Company's process.

BLAST FURNACE

Historical. In speaking of the high bloomary it was stated that, if the reducing action were too strong, cast iron, instead of wrought iron, was unintentionally produced. From this to the modern form of shaft furnace—or *blast furnace*, as it is always called—is a simple and natural transition. The old name *high furnace* is still used in France and Germany (*haut fourneau*, *Hochofen*). The first blast furnace was operated about the thirteenth century. Until the beginning of the last century they were about 20 to 30 feet high, rectangular or circular in cross section, shaped outside like the frustum of a pyramid or cone with the smaller end on top, and were constructed of blocks of stone. They were situated close to a steep hillside, so that a level trestle could be placed from the hillside to the top of the furnace to avoid the expense of a hoist for charging the raw materials. Frequently there was only one tuyère, of a peculiar construction, quite unlike the water-cooled tuyères now employed. Cold air, under only moderate pressure, was furnished by blowing engines of the simplest possible type, generally driven by water power, with wooden connecting rods and wooden blowing "tubs" or cylinders provided with leather valves. As the furnaces were open at the top, the combustible gases produced escaped into the air and frequently ignited. Charcoal was the principal fuel used. Dudley in 1619 demonstrated that coke could be successfully substituted, but no advantage was taken of this discovery until considerably later.

Unquestionably the greatest improvement was the introduction of hot blast by J. B. Neilson, of Glasgow, Scotland. He was granted a patent in 1828 for preheating the blast for smiths' fires, and the next year this was adopted for a blast furnace at the Clyde Iron Works. In a few years it was almost universally employed. Like most other great discoveries, the principle upon which it is based is comparatively simple, being briefly as follows: A pound of carbon, whether burned in a minute or in a year, generates the same *amount* of heat. In the former case, however, the *degree* of heat, or the temperature, will be very much greater. Also the temperature generated by a definite amount of fuel, burned in a given time, will depend upon its initial temperature and the nature of the surrounding materials (including the products of combustion) which absorb the heat, other conditions being the same. In a blast furnace a certain temperature is requisite to effect the proper reduction and fusion. Therefore, if part or all of the materials is introduced in a heated condition, a smaller amount of fuel will develop the necessary temperature. A fuel ratio of about eight to one in 1820, with cold air, has been reduced to one to one and even less at the present time; but it should be stated that a considerable part of this is due to other improvements, mentioned below.

Blast-Furnace Equipment. Before taking up the process, as at present conducted, a clear idea should be formed of the apparatus used. A modern plant, comprising one or more furnaces with an individual capacity of 300 to 600 tons of pig iron per day, is constituted as follows: In the first place there is the furnace proper or *stack*, in which the actual smelting of the ore takes place. The raw materials are hoisted to the top in a large box or bucket, called a *skip*, and there mechanically dumped. When the ore comes from the Great Lakes, a large supply or *stock pile* must be provided for use during the winter months, as navigation is open only from about May to November. The ore is taken from the stock pile by means of gantry cranes equipped with buckets and is placed in separate bins, according to the grade, which is carefully determined by chemical analysis. From these it is transferred to the skips by scale cars in which the predetermined mixture of the various ores is carefully weighed.

The engines for compressing the blast are driven either by steam or, more recently, by gas. The engines must be powerful enough to deliver the air at a normal pressure of 12 to 16, and in an emergency up to 25, pounds per square inch. When steam is used, a battery of boilers must be provided, usually fired with the gas given off from the furnace. The advantage of gas engines is their greater efficiency, and the excess power is then available for generating electricity or for some other purpose. The air, after being compressed, is passed through regenerative fire-brick stoves, of which there are usually four to each furnace. These stoves, although of smaller diameter, are frequently taller than the furnace. The gas given off from the blast furnace is first led into a large chamber or *dust catcher*, where most of the suspended particles of dust are deposited. From this it may be led directly to the stoves and boilers, where it is burnt. If used for gas engines, however, the remaining dust must be further removed as completely as possible, and it is therefore *cleaned* and *scrubbed* with water in special apparatus. In front of the furnace is the *cast house*, which is a roofed structure with a sand floor if the iron is to be cast directly into pigs, or else of smaller size and provided with runners and spouts for delivering the molten metal into ladles in which it is transferred to the steel plant or to the pig-casting machine. In some cases the metal is run into iron or *chill* molds set in the cast-house floor so that the surface of the pigs will be free from sand. The molten slag is similarly removed in ladles and disposed of as waste material or in some cases used in the manufacture of cement.

We may now consider the more important parts of the equipment in somewhat greater detail.

Stack. The interior of the furnace was formerly of a cylindrical shape, i.e., the walls were perpendicular and the cross section circular. In modern furnaces, however, there are three well-defined divisions, as shown in Fig. 2: (*a*) at the bottom is the *hearth* (also called the *well* or *crucible*), which is cylindrical; (*b*) above this the walls slope outward, forming an inverted truncated cone known as the *bosh* (this term is also used to denote the point at which the internal diameter of the furnace is greatest); (*c*) above this again the walls converge to the top or *throat*, forming another longer truncated cone set upright, this portion being known as the *shaft* or *stack*. The reason for the gradual increase of the diameter from the top downward is to facilitate the descent of the charge, which would tend to stick and choke up the furnace if the walls were perpendicular. From the bosh line to the hearth the diameter is decreased, because it is principally here that the fuel is burned, and, unless due allowance were made for this reduction in bulk, the charge would descend too rapidly in this region, and the action on the ore or sponge would be uncompleted.

The furnace is built of fire bricks inclosed in a jacket of riveted steel plates, which generally extends to the top. In the walls of the hearth and bosh are inserted *cooling plates*, through which water constantly circulates, to prevent excessive corrosion of the brickwork and thereby preserve the lines of the furnace as much as possible. The blast is introduced at a point near the top of the hearth through tuyères, of which there are usually from 8 to 16, depending upon the design and the size of the furnace. These are joined by pipes to the *bustle* pipe, which encircles the furnace and is connected with the hot-blast main. Surrounding the portion of the *blowpipes* which penetrates into the furnace are hollow water-cooled bronze or copper *blocks* to prevent them from being burned away at the very high temperature to which they are continuously exposed. The entire cooling system is of the greatest importance, and the discharge pipes are arranged in full view so that they may be under constant observation. A little below the tuyères is located the hole called the *cinder notch*, out of which most of the slag is tapped. Below this again, and at about 90° to one side, is the *iron* or *metal notch*, out of which the iron runs when the furnace *casts*.

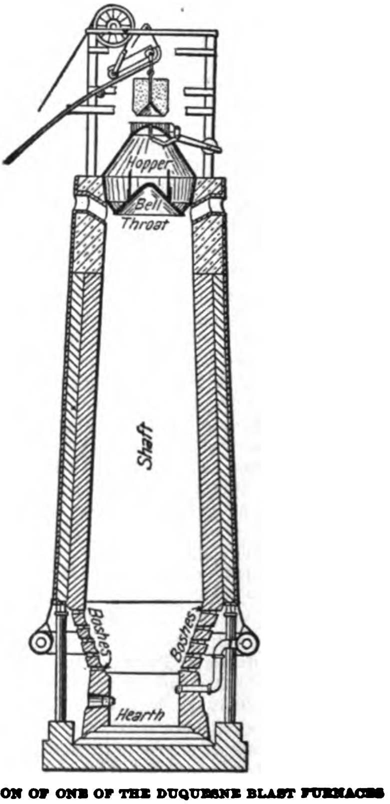


FIG. 2. SECTION OF ONE OF THE DUQUESNE BLAST FURNACES

Except during charging, the top of the furnace is closed, and the gases are led off through a large pipe, called the *downcomer*, into the *dust catcher*, and thence to the stoves and boilers or after cleaning to the gas engines. While the furnace is being charged, which happens at frequent intervals, the escape of the gases is prevented by an arrangement of two bells or cones, one somewhat smaller than the other and a short distance above it, one of the bells always being closed, the space between forming a chamber. The charge is placed around the upper bell, which is then lowered, depositing it on the lower bell, when it is raised again and closes the top. The second bell is then in turn lowered and the charge dropped into the furnace.

Until nearly the beginning of the present century the charging was done entirely by hand. The stock was loaded on wheelbarrows, which were weighed and then hoisted to the top on an elevator. The contents were then dumped around the bell, of which there was usually only one. This method is inadequate to supply the necessary amount for the present large furnaces, and the material is therefore hoisted in skips running on an inclined track or *skip bridge*.

Stoves. The earliest type of stove consisted of a row of cast-iron pipes, generally U-shaped, inclosed in a brick combustion chamber and heated externally with fuel in much the same manner as in the case of a water-tube boiler. The blast from the blowing engines passed through these pipes uninterruptedly. Although this style of stove was employed for a long time, it was not satisfactory, as the temperature to which it could heat the blast was limited by reason of the danger of burning out or melting the cast iron. It has been superseded, commencing about 1860, by the regenerative fire-brick stove, the first of which was invented by Whitwell. The temperature which can be secured in this stove is limited practically only by the question of efficiency.

The general form is a very high cylindrical chamber with fire-brick walls inclosed in a steel casing. In this is a large flue or combustion chamber in which the gas from the blast furnace is burned. The hot gaseous products of combustion are then led through other smaller flues filled with bricks with small passages left around them, called *checkerwork*, the arrangement being such as to offer the maximum surface for heating purposes. Various designs and modifications are in use which differ slightly in the method of heating. The gases, after reaching the top of the combustion chamber, may be led through the checkerwork and thence to the stack, or they may then be deflected upward again, heating another part of the stove and escaping at the top. The former is called a *two-pass* and the latter a *three-pass* stove. When a stove has been sufficiently heated, the gas is shut off, and the blast is introduced, passing through in the reverse direction to that which was followed by the gas. Purification of the gas, in the same manner as when intended for gas engines, has shown a marked improvement. With four stoves to a furnace, each stove, in rotation, is "on gas" (i.e., is heated) for about three hours and "on wind" (is heating the blast) one hour.

Blowing in is the term applied to starting up a furnace when it is new or has just been relined. It is first necessary to dry it out thoroughly so that there will be no moisture present, and then to heat it up gradually to prevent cracking of the walls from the sudden expansion which would result if the full temperature were attained immediately. Principally fuel, with only small amounts of ore and flux, are charged at first, the proportions being gradually increased with succeeding charges of coke, the full *burden* (the proportion of ore to fuel) being reached only after a day or two.

Charging. The charge is made up of ore, fuel (coke), and flux (limestone). The relative proportion of each is calculated from their respective compositions as determined by very accurate chemical analysis. The amounts of ore and limestone are based on a definite unit of coke. The ore and limestone are carefully weighed each time; the coke, however, is simply measured, as the weight of a definite volume practically does not vary. One complete charge of ore, coke, and limestone is termed a *round*. The coke is charged first, followed by the ore and limestone.

The rate of charging depends upon how fast the stock descends in the furnace. It is very important to keep the furnace constantly filled to a certain level, called the *stock line*, as otherwise irregular working would result. If, owing to part of the charge sticking to the walls, the material at the top is prevented from descending, the furnace is said to be *hanging*, and its subsequent sudden descent, after the obstruction has been removed, is termed a *slip*. When this occurs, there is an immediate increase in the internal pressure, which may result in a violent explosion, causing serious damage to the equipment as well as loss of life. To relieve this condition *explosion doors* are provided at the top of the furnace, which open automatically under any marked increase of pressure. A valve operated by hand, called a *bleeder*, may also be opened when a slip is anticipated. Julian Kennedy has attacked the problem in a satisfactory manner from the opposite standpoint by devising a *closed top* of sufficient strength to resist the force of the explosion, which thereby loses its suddenness and hence much of its violence.

The make-up of the charge requires good judgment and considerable experience, not only of the principles involved, but also of the individual behavior of different furnaces, the materials used, and the product desired. It is the function of the limestone to flux the siliceous gangue and also to render the slag sufficiently basic to prevent an undue amount of sulphur and silicon from entering the iron. There is a set of interdependent conditions involved: the larger the proportion of lime, the more basic the slag and the higher its melting point, which in turn determine the fuel requirements and the temperature of the furnace, which again largely controls the degree or intensity of reduction. By proper manipulation one condition may be made a greater factor than another, with corresponding success or failure in the object sought.

With ordinary ore, containing about 50 per cent of iron, the proportions of materials entering and leaving the furnace, per ton of pig iron produced, are approximately as follows, expressed in tons:

ENTERING THE FURNACE		LEAVING THE FURNACE	
Ore	2	Pig iron	1
Coke	1	Slag	½
Limestone	½	Gases	6
Air	4		
Total	7½	Total	7½

From this it will be seen that the air constitutes over one-half of all the materials going into the furnace, while the escaping gases represent over three-quarters of the material which comes out. The reason for this difference is that the oxygen, carbon, and other substances which enter the furnace as solids are converted into the gaseous state by certain chemical reactions.

Furnace Reactions. When the heated blast enters the furnace at the tuyères, it comes in contact with incandescent coke, and carbon dioxide (carbonic acid) is formed. This in turn reacts immediately with additional coke (carbon) and is reduced to carbon monoxide (carbonic oxide), both of which are gaseous. This carbon monoxide passes up through the charge and comes in contact with the descending ore. In this way the iron oxide loses nearly all of its oxygen, part of the carbon monoxide being changed to dioxide, so that by the time the ore has proceeded some distance down it is in a spongy, semimetallic condition. In the lower part of the furnace, in the region near the tuyères, the reduction of the iron is completed in contact with the solid incandescent coke, and about 4 per cent of the carbon is absorbed as the metal melts and trickles down into the hearth. The carbon dioxide in the limestone is driven off near the top of the furnace, and the calcium oxide (burnt lime) remaining gradually combines with the gangue, and the resulting slag finally melts somewhat lower in the furnace than the iron, as it requires a higher temperature for its fusion. It also collects in the hearth, floating on top of the iron on account of its lower specific gravity. The coke remains solid throughout its descent, gradually decreasing in amount as it is burned away. What remains is forced down through the slag and iron to the bottom of the hearth, where further opportunity is afforded for carburizing the iron.

Casting. The iron is allowed to remain in the hearth until a sufficient amount has collected. The usual practice for large furnaces is to tap out the iron about every four hours. Most of the slag is tapped out through the cinder notch at more frequent intervals, depending upon the volume formed, so that it will not rise above the tuyères and prevent the free entrance of the blast; this is termed *flushing*. It is allowed to run into a ladle which conveys it away. When the iron notch is first opened, nothing but iron runs out, but as the level in the hearth sinks it is accompanied by a certain amount of slag. This is separated from the iron by a *skimmer*, a depression or well in the main runner or trough, directly in front of the furnace, across which is set perpendicularly a cast-iron plate coated with loam and extending a little way below the regular bottom of the runner. The iron fills up the depression and continues to flow underneath; but the slag, being lighter, is backed up by the plate and overflows into a side runner leading to the slag ladle. The iron, by means of a main runner and a number of branch runners, is led into other ladles, being subsequently cast into pigs in a special machine, or else taken to the mixer or to some steel-making furnace for refining.

When the hearth is nearly empty, the hole is closed up by ramming in balls of clay, the blast being almost entirely shut off (by slowing down the blowing engine) while this is being done. This is the only time when the blast is not on full during normal working. The clay was formerly rammed in by hand, but this method has been practically abandoned in America in favor of a mechanical device known as a *gun*.

A few furnaces still employ charcoal instead of coke for fuel. They are necessarily smaller (about 30 to 40 feet high), as the charcoal will not sustain such a heavy weight (high column) without crushing as coke, one of the functions of the fuel being to keep the charge sufficiently open for the passage of the gases. With charcoal the process is also run at a lower temperature, and occasionally the blast is not preheated. The product is accordingly known as *hot-blast* and *cold-blast charcoal iron* respectively. It is used almost exclusively for high-grade castings, as it possesses certain qualities which make it especially desirable for this purpose. Anthracite furnaces are usually operated with a mixture of coke and anthracite coal.

Product. As already stated, pig iron contains other elements besides iron, the range in composition in the United States being about as follows:

Iron	92.00	to	95.00	per cent
Carbon	3.00	"	5.00	"
Manganese	0.50	"	2.00	"
Phosphorus	0.05	"	1.00	"
Sulphur	0.02	"	0.10	"
Silicon	0.50	"	3.00	"

It frequently also contains other elements in varying amounts, such as copper, nickel, chromium, titanium, etc.

The carbon may exist either in combination with part of the iron as iron carbide, Fe_3C, or uncombined as graphite. In the former case the fracture of the pig is white, in the latter case black; and if part of the carbon is combined and part is free, the fracture will have an intermediate or mottled appearance. The condition of the carbon depends upon a number of factors. The tendency to be combined is increased by the presence of manganese or sulphur or by rapid cooling. It is decreased by the presence of silicon or by slow cooling.

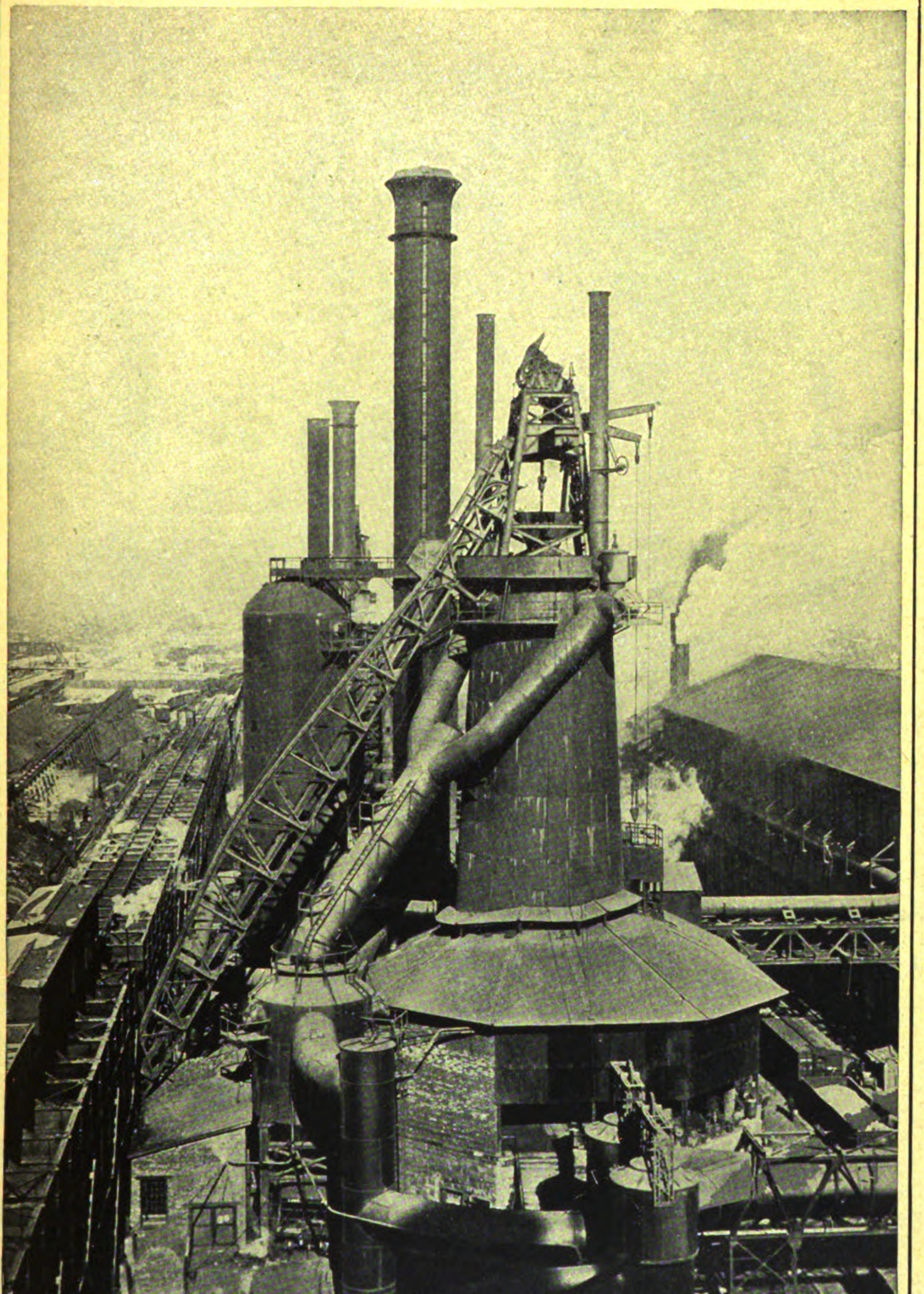
Foundry irons—those used for making castings—must usually contain a considerable amount of silicon. This causes nearly all the carbon to be in the graphitic form so that the casting will be soft and readily machined. A certain amount of phosphorus may be desirable, as it makes the iron more fluid, so that the casting will be sharp, i.e., any intricate parts of the mold will be completely filled. Sulphur in any considerable amount tends to make the iron thick and sluggish.

For steel-making processes there is a general division based on the phosphorus contents. When it is below 0.1 per cent, it is suitable for the acid Bessemer and generally for the acid open-hearth processes in which there is no elimination of this element. For the basic Bessemer process, being depended upon as the source of heat, it must run over at least 2 per cent; for the basic open-hearth process, however, it is preferable to have it reasonably low. The former grade is termed *Bessemer* pig, and the latter *Thomas, basic,* or *non-Bessemer* pig. The sulphur in either grade is generally required to be low—for the acid processes not over 0.05, and for the basic processes not over about 0.05 to 0.10 per cent.

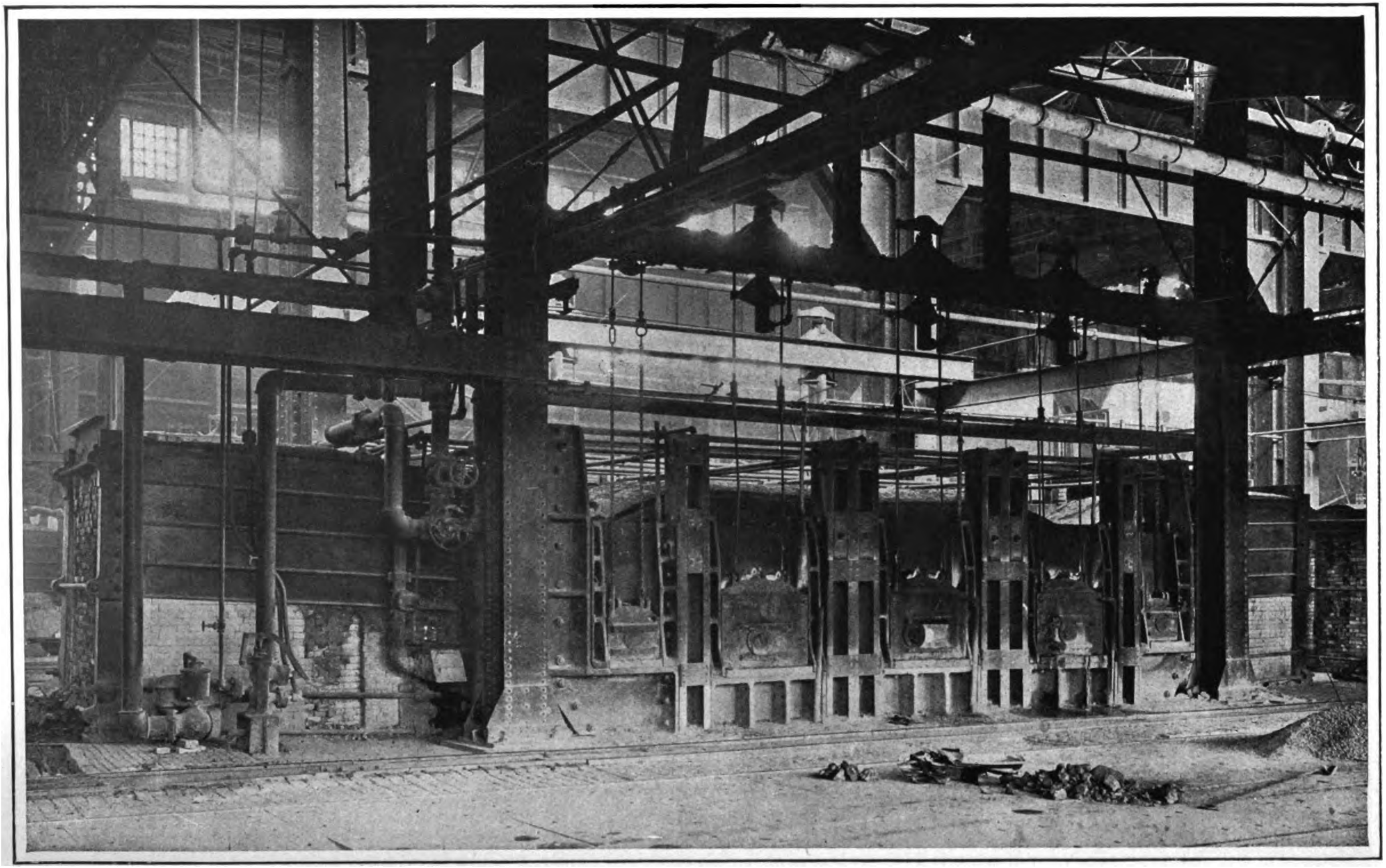
There are other special products similar to ordinary pig iron, but having a high percentage of some special element because of which they are principally valuable as additions to secure a given composition. These are termed *ferro-alloys* or *special pig irons*, and are made either in the blast furnace or, in some cases, in an electric furnace or by reduction by aluminium. A few of these are given below:

Ferrochrome: chromium about 60 to 68 per cent; produced in the blast furnace.

Ferromanganese: manganese about 80 per



A MODERN BLAST FURNACE
Blast Furnace of Colorado Fuel and Iron Company at Pueblo, Colorado. Capacity, 600 Tons.



OPEN-HEARTH FURNACE

Forty-Ton Open-Hearth Furnace at the Homestead Steel Works of the Carnegie Steel Company.

cent. This term is also applied to any pig iron containing over 30, usually over 60, per cent. With manganese between 10 and 30 per cent it is called *spiegel* or *spiegeleisen*. *Silicon spiegel* contains about 17 to 22 per cent of manganese and also 6 to 12 per cent of silicon. These are all produced in the blast furnace.

Ferrosilicon: silicon about 10 to 20, usually about 12, per cent; produced in the blast furnace. A higher grade than this is also produced in the electric furnace and ordinarily contains over 40 per cent of silicon. It is known as *special ferrosilicon* or *special high-silicon iron*, and is commonly guaranteed to contain either 50 or 75 per cent.

Ferronickel: nickel 25 to 75 per cent, as specified.

Ferrotungsten: tungsten 60 to 85 per cent.

Ferrotitanium: titanium 10 to 12, and also about 50, per cent.

Ferrovanadium: vanadium 20 to 35 per cent. The four last named, and in general those containing rare elements, are produced by special processes and are sold per pound of alloy or per pound of the element in question. The others are sold by the ton, except where some special process is employed to produce a given element as free as possible from impurities, in which case it is also sold on the pound basis.

Dry-Blast Process. This is a comparatively recent development in blast-furnace practice, although Mushet in 1879 took out a patent based on the use of calcium chloride, etc. The amount of water carried into a furnace due to the moisture in the blast is much greater than would at first glance seem possible. Thus, a furnace of the average size in the Pittsburgh district consumes about 40,000 cubic feet of air per minute and passes into the furnace approximately 40 gallons of water per hour for each grain of moisture contained in a cubic foot of air. This water, being introduced at the tuyères, is immediately decomposed by the incandescent coke by a reaction which absorbs a large amount of heat. This effect is not constant, for the percentage of moisture in the air varies according to the season of the year and even from hour to hour. The object of drying the blast is therefore twofold—to remove as much moisture as possible and to maintain the remainder constant.

This was first successfully carried out by James Gayley at Isabella Furnace No. 1 of the Carnegie Steel Company in August, 1904. His method was to pass the air around pipes in which circulated iced brine cooled to a temperature below the freezing point of water, the moisture being deposited upon the pipes in the form of snow. The effect, resulting in reduced fuel consumption and more regular working, was even greater than expected, for a number of reasons which cannot now be considered. Since then a number of other methods have been devised in which calcium chloride is employed as the desiccating agent.

Disposal of Pig Iron. The molten pig iron from the blast furnace may be either used direct in its molten condition or cast into pigs for transportation cold. The latter method has the disadvantage that the heat lost must again be supplied when it is remelted, thereby adding to the cost of manufacture. The pigs may be cast in sand or iron (*chill*) molds in the floor of the casting house or by means of a *pig machine*. The type of pig machine most commonly used in the United States consists of one or more endless strings or *strands* of metal molds mounted on vertically revolving drums. The metal is run from a ladle into the molds at one end and is rapidly cooled by being sprayed with water and later passing through a tank of water, as the molds advance, so that the pigs are cold enough to be dumped into a car or other receptacle when they reach the other end. If the metal is used direct in its molten state, it may be transported in ladles and poured into the furnace or converter in which it is to be further treated. A better practice is to pour it into a large vessel, termed a *mixer* (see Fig. 3), which serves primarily as a reservoir from which it can be taken as needed, thus avoiding delays waiting for the blast furnace to cast, and also preventing chilling if the furnace is not ready to receive it. Generally a small amount of gas is burned in it to maintain the temperature of the metal. As its name implies, the mixer serves another useful purpose, which is to provide a more uniform and constant composition by permitting the metal from a number of different casts from the same or different blast furnaces to be poured into it. There may also be some removal of sulphur by a reaction with manganese, if a sufficient proportion of the latter is present, the manganese sulphide resulting passing out of the metal and into the slag; this requires a considerable time, at least an hour or more. The mixer is the invention of Capt. W. R. Jones, of the Edgar Thomson Works of the Carnegie Steel Company. Attempts have been made from time to time, generally with considerable success, to employ the mixer to obtain a partial or preliminary refining of the pig iron in order to reduce the amount necessary later.

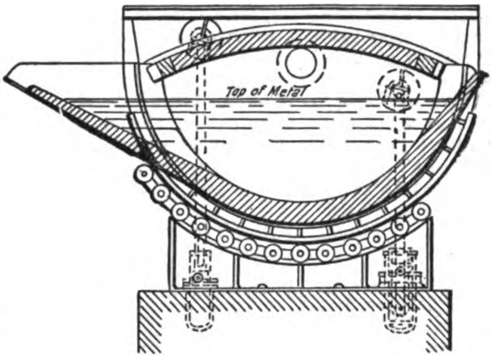


FIG. 3. MIXER FOR MOLTEN PIG IRON.

Malleable Cast Iron. This is originally white cast iron, in which the combined carbon has been converted by special heat treatment into an uncombined amorphous condition, also usually more or less removed by oxidation. This carbon exists in small spots or patches which do not break up the continuity of the metal nearly so much or so detrimentally as do the large thin plates of graphite, in the case of ordinary gray cast iron, which promote or assist fracture by serving as cleavage planes. The usual method consists in heating the white cast iron (in which practically all the carbon is in the combined form) to a temperature between about 750° and 1100°C (1380° and 2010°F), when the conversion of the carbon to the amorphous, uncombined condition takes place. The essential conditions appear to be the proper temperature, a sufficient length of time, and the presence of a certain amount of silicon. The castings are generally less than an inch in thickness so that when cast the cooling will be sufficiently rapid to avoid the formation of graphite. After cleaning, the castings are packed in some material, such as ore or clay, in an iron box, called a *sagger* or *annealing pot*, to protect them from the air, which otherwise would cause excessive scaling. Depending upon the nature of the surrounding material, more or less oxidation of the carbon occurs. In the United States usually only the outer portion is affected, and the fracture shows a white border surrounding a black interior, from which comes the designation *black-heart malleable*. Abroad the oxidation is frequently carried further so that the entire fracture is white. The product is capable of some deformation (hence the name *malleable*) and also offers considerable resistance to shock. The process was discovered by Réaumur in 1725.

PURIFICATION PROCESSES

Practically any reduction process by which metallic iron is produced from ore or oxide has the disadvantage of introducing into the iron considerable amounts of foreign elements or substances which, for the majority of uses, are objectionable if not positively detrimental. We have already seen that, owing to its pasty condition, wrought iron produced by the direct process contains intermingled slag, and that, if the temperature is raised sufficiently to obtain it in a fluid state, it greedily takes up carbon, while phosphorus and silicon are also reduced and combined with it. The subsequent removal of impurities in excess of what is desirable constitutes a general treatment known as purification, which must, as a rule, be conducted under oxidizing conditions.

Purification, in general, is divided into: (*a*) *refining processes*, those principally concerned with the removal from pig iron of silicon, phosphorus, and sulphur, the action being stopped when the carbon is attacked—the product is further treated by some other process; (*b*) *purification processes*, those embracing certain details or modifications applied to ordinary processes for making iron and steel.

From a practical viewpoint purification processes are not considered to include the regular processes for the manufacture of steel and wrought iron, although, from strictly theoretical considerations, these should properly be included.

Fining, refining, and **hearth refining** are some of the terms given to this treatment, which is still employed to a limited extent to produce material principally for the charcoal hearth process (see below). The type of furnace is called a *finery*, *refinery*, etc. (see Fig. 4). It consists of a hearth, which is generally rectangular in cross section, formed of water-cooled iron plates, and of a capacity to treat a charge of about one-half to two tons of pig, which may be charged molten or more commonly solid. The fuel is either coke or charcoal which is burned by the blast, usually supplied by two tuyères opposite to each other, which also furnish the oxygen necessary for oxidizing the silicon, etc. If ore is added, part of the phosphorus is removed. Each change takes about two hours, but less if the metal is initially molten. The product (*fine metal*, *refined metal*, or *refined cast iron*) is usually tapped out on the iron plates of the floor or into iron molds, which causes a white fracture due, however, even more to the almost complete absence of silicon.

Pig-Washing Processes are a modification of ordinary refining and are used to obtain a metal very low in phosphorus and silicon, for use principally in the manufacture of special steel. In *Bell's pig-washing process* the molten pig is agitated with molten oxides of iron only. At the low temperature employed and in the presence of the very basic slag most of the silicon and the phosphorus are removed up to 90 to 95 per cent of the original contents, the metal being tapped out, however, before the carbon has been materially attacked. Krupp's pig-washing process, patented a couple of months later, is essentially the same, except that a certain proportion of oxide of manganese was used. They are now commonly referred to as the Bell-Krupp process, and the special addition of oxide of manganese is dispensed with as unnecessary. Somewhat similar methods have been tried from time to time with more or less success. For example, *Talbot's slag process* consisted in removing some silicon and phosphorus by pouring molten pig iron through a layer of slag rich in lime and iron oxide contained in a vessel somewhat resembling a ladle. In the *Ellershausen* process the metal from the blast furnace was run through troughs lined with iron oxide.

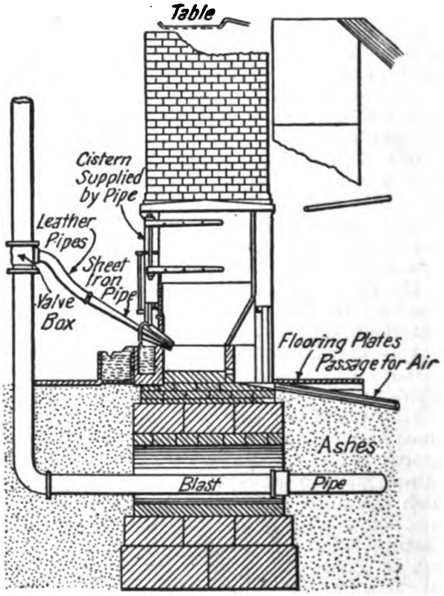


FIG. 4. MELTING FINERY FOR TREATING PIG IRON.

The processes mentioned above have only a slight effect on the sulphur. Among those designed specially for its elimination may be mentioned the following: The *Massenez* or *Hoerde process* is based upon the fact that sulphur combines with manganese (if in sufficient amount) in preference to iron, the resulting manganese sulphide being insoluble in the molten iron, and therefore passes off into the slag if the requisite time is allowed. In

Heaton's process nitrate of soda was placed in the bottom of a ladle or other suitable vessel, being kept in place by an iron grating, and molten pig iron was poured on top. It was claimed that the action of the nitrate was to remove some of the phosphorus, all of the silicon, and nearly all of the sulphur. The *Saniter process* depends upon the use of calcium chloride in a slag containing a high percentage of lime, the principal action of the chloride being, apparently, to render the slag very fluid, fluorspar also being added for this purpose. It should be observed that puddling and steel-making processes are merely special and highly developed applications of the foregoing methods and principles.

CHARCOAL HEARTH PROCESSES

These processes are designed for the production of wrought iron by the purification of pig iron. The metal is obtained in a pasty condition, as the temperature is not sufficient to melt it after its decarburization and purification, and hence contains a certain proportion of intermingled slag. The name is derived from the fuel and the type of furnace employed. The hearths are low rectangular chambers, with one or more tuyères, resembling those used for the bloomary or Catalan processes for the direct reduction of iron from the ore. They are usually built of unlined cast-iron plates, water-cooled in part at least. Brickwork is avoided, as it would contribute silica to the slag and decrease its basicity, thereby destroying its effectiveness.

The general practice is to fill the hearth to a point above the tuyères with charcoal, upon which the pig iron is placed and gradually melted down. The blast from the tuyères encounters the molten metal as it trickles to the bottom, oxidizing the carbon and impurities, which latter are largely retained by the highly basic slag which is present. The slag from a previous charge is usually allowed to remain in the hearth and is augmented by the simultaneous oxidation of part of the iron. It is usually stirred into the pasty iron to assist further in its decarburization and purification. The metal so obtained may be further purified and freed from slag by a second or even a third melting operation under the same conditions. Most of the remaining slag is then removed by hammering the bloom. If the decarburization is not carried so far, the metal can be obtained with sufficient carbon to enable it to be hardened by quenching, and on account of this property it is then termed *steel.* Quite a number of methods were designed with this object in view.

There are various modifications, known by special names, which differ principally in minor details which need not be considered here. The *Swedish Walloon process* is still used in Sweden for making bars to be converted into blister steel. The American Lancashire process, brought to America by Welsh workmen, is no longer employed; there is, however, a modification still used, but to a very limited extent, for furnishing material for special sheets and tubes, in which wrought-iron or soft-steel scrap is melted with charcoal. The *South Wales process*, employing refined cast iron from the finery, was also used in America under the name of the *knobbling process.* Charcoal hearth iron is of better quality than puddled iron (see below), as it contains less intermingled slag, but principally because it is purer, being made from a better grade of material, preferably charcoal pig or refined cast iron, and charcoal which contains only traces of sulphur.

PUDDLING PROCESS

This process, like those just described, has for its object the production of wrought iron (rarely wrought steel) by oxidizing and removing most of the carbon, silicon, manganese, phosphorus, and usually some sulphur, contained in pig iron, the operation being conducted on the hearth of a reverberating furnace. The charge during the early stages is molten, but, owing to the temperature not being sufficiently high, the final product is in a pasty state and for this reason is mechanically mixed with a certain proportion of slag, most (but never all) of which is removed during subsequent steps in its manufacture.

Until 1784 all wrought iron had been made from ore by some direct process or from cast iron by a charcoal hearth process. In this year, however, Henry Court, in England, gave a new impetus to the iron industry by a patented process, termed *puddling,* which did not require an air blast and greatly reduced the cost of production.

The oxidation and removal of the carbon and impurities were effected by the oxygen in the air and in the gases passing over the charge, together with that furnished by the oxide of iron obtained by the oxidation of the iron itself. The loss of iron in this way was very heavy, as the hearth was originally lined with sand which, being acid in character, combined readily with the basic iron oxide formed. A sufficient amount of the latter had to be provided to render the slag sufficiently basic to complete the purification, particularly with regard to the phosphorus. An improvement introduced by Hall in 1830 consisted in lining the hearth with iron ore instead of sand and by adding a certain amount during the operation. By this means the heavy oxidation of the metallic iron was greatly reduced and there was greater control over the purification.

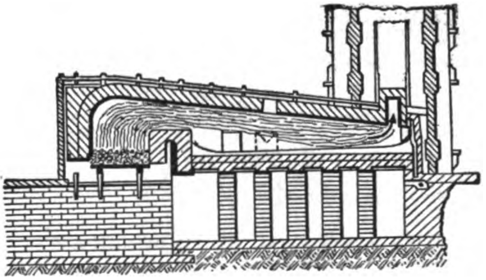


FIG. 5. PUDDLING FURNACE.
Longitudinal section.

Puddling Furnace. The hearth (see Fig. 5) is built of cast-iron plates, water-cooled, and carried on brick walls or on short iron pillars. It is usually about 5 or 6 feet long, and 4 feet wide opposite the charging door. The fuel is generally bituminous coal, although gas is occasionally used. Between the grate and the hearth is a fire-brick *bridge wall*, and at the other end of the hearth, and separating it from the chimney, is a second bridge or *altar*, both of these serving to prevent the overflow of metal during the working of the charge. On the side of the furnace opposite the middle of the hearth is the working door, closed by a slide lined with fire brick which can be raised or lowered. A small opening at the bottom of the door permits the introduction of a *rabble* (an iron instrument resembling an ordinary hoe), with which the workman can stir the charge. The roof of the furnace is in the form of an arch, about 2 feet at the fireplace, and sloping gradually until at the chimney it is less than a foot above the bottom of the flue. Such a furnace has a capacity of about 400 to 600 pounds per charge.

Lining and Fettling. The bottom and sides of the hearth are covered with ore or slag rich in iron oxide, which is set in place by heating to a high temperature. After a charge has been drawn, the hearth is repaired (*fettled* or *fixed*) by throwing in ore or similar material, slightly moistened. Since Hall's modification the process has been carried on without any material change except in relatively unimportant details. Efforts have been made to substitute mechanical devices for hand labor, but without much success.

Operation. After the furnace has been fettled, about 200 to 600 pounds of pigs are thrown in, and the door is closed. In about 20 minutes melting commences, and after the fusion is complete the bath is worked with a rabble to expose the iron to the action of the slag and the flame. The silicon is oxidized first, and when this has nearly all been eliminated the iron *clears*, i.e., the bath loses the mottled appearance it had up to that time. The phosphorus is removed during this and the subsequent period. The temperature is now slightly raised, and the carbon is attacked, the resulting evolution of carbon monoxide, a gas, constituting the period known as the *boil*, and puffing up the slag so that the level of the bath is raised. As the carbon is burned away, the charge becomes more and more pasty, owing to its increasing melting point, and finally the bath drops to its former level. About this time grains of nearly pure iron appear on the surface, and the iron is said to have "come to nature." At this point in the process the charge must be well worked to insure proper welding together of the particles. When the action is completed, the pasty mass is broken up with a bar into lumps called *balls* (the operation being termed *balling*) of about 100 to 200 pounds each. These are drawn successively from the furnace by means of tongs. The total time for a charge is about one to one and three-quarters hours.

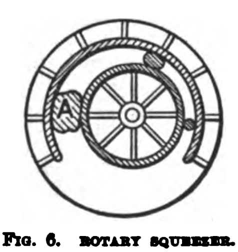


FIG. 6. ROTARY SQUEEZER.

The puddle balls are taken from the furnace directly to the *squeezer*, a machine in which the greater part of the intermingled slag is expelled and the grains of iron thoroughly welded together. The present form (see Fig. 6), known as a rotary squeezer or Burden squeezer, consists of a cylinder with teeth, like a cogwheel, mounted on a vertical shaft and revolving inside a casing, set eccentrically, and also provided with teeth. The ball, *A*, is inserted where the distance between them is greatest, and is progressively crushed and reduced in size as it is carried around to the point where the distance is smallest. Hammers were formerly used for this operation, which was termed *shingling*.

Piling. After squeezing, the rough bloom is rolled out into a flat bar known as *muck bar* or *puddle bar*. This is then cut up into short pieces, and a number placed together to form a *pile*, which is heated and rolled again. The operation of piling and rerolling may be repeated with improvement in the quality of the product. Instead of piles, a rough box may be made, the sides, bottom, and top consisting of pieces of muck bar, the interior being filled with small pieces of scrap iron. This is termed a *fagot*. Small pieces of iron are also heated up in a furnace until they can be formed into a ball (*scrap ball*), which is handled in the same manner as already described. *Puddled steel* or *wrought steel*, now practically obsolete, is made in a similar way, and the same cinder may be used; but the process must be arrested before there is such a complete removal of carbon, and it is therefore carried on at a somewhat lower temperature. The product contains up to about 0.5 per cent carbon, while wrought iron has usually less than 0.1 per cent, but there is no sharp division between them. The term *steel* was applied only when the product could be hardened by quenching. Wrought iron is chiefly used for bars, principally where welding may be required, stay bolts for boilers and boiler fire boxes, tubes, and roofing sheets.

CEMENTATION PROCESS

This process, sometimes called in England the *converting process*, depends upon the fact that iron, when heated under the proper conditions in contact with carbonaceous matter for a long period of time at a temperature below its melting point, will absorb or become impregnated with a certain amount of carbon. It is used to a limited extent, chiefly in England, for the production of high-carbon bars to be employed in the manufacture of crucible steel and *shear* steel. The bars are usually of pure Swedish iron made by the Walloon process, already described. They are packed in layers, separated by and covered with powdered charcoal, in fire-brick chambers, called *converting pots*, contained in the *cementing* furnace (see Fig. 7). The top of each pot is closed with an arch of wheel swarf which frits when heated and forms an air-tight cover. The furnace attains its full temperature in about three to four days, at which it is maintained about seven to eight days for *mild heats*, about nine and one-half days for *medium heats*, and about 11 days for *high-carbon heats*. The cooling down requires about four to six days. If wrought iron has been employed, the finished bars will be covered with blisters formed by a reaction between the contained slag and the carbon, whereby carbon-dioxide gas is generated. From this characteristic appearance the name *blister bar* or *blister steel* is derived. These blisters are not produced when low-carbon steel bars are similarly treated, owing to the almost complete absence of slag. In the Sheffield district, where this material is principally made and consumed, practically nothing but wrought iron is used. If bars of very high carbon content are desired, a retreatment may be given, and the product is then termed *doubly converted bars*.

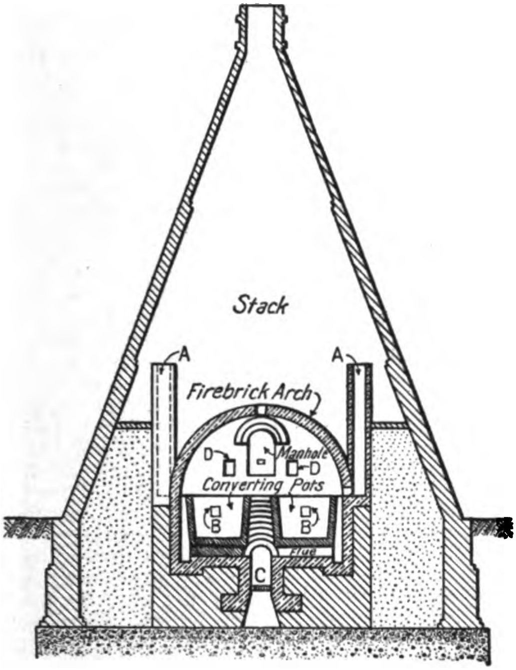


FIG. 7. TRANSVERSE SECTION OF CEMENTATION CONVERTING FURNACE.

A, short chimneys communicating with stack; *B*, holes for removal of trial bar; *C*, fire grate; *D*, holes for removal of trial bars.

The penetration of carbon being from the outside, there is naturally a progressive decrease in percentage from the surface to the centre. As an example of this, a bar ½ inch thick contained at the outside 1.50, at the centre 1.15, and an average for the entire cross section of 1.33 per cent. In Sheffield six grades of cement steel are recognized under the following names, the percentages of carbon being approximately as given: (1) *spring* heat, 0.50; (2) *country* heat, 0.63; (3) *single-shear* heat, 0.75; (4) *double-shear* heat, 1.00; (5) *steel-through* heat, 1.25; (6) *melting* heat, 1.50.

Blister bars rolled or hammered down at a yellow heat are known as *plated* bars or *bar steel*. In the manufacture of shear steel a number of pieces, broken to a suitable length, are piled together, constituting a *fagot*, covered with fire clay and borax to avoid excessive oxidation, and drawn out under a hammer into a bar termed *single-shear* steel. If this bar is doubled back upon itself and welded together, it is then known as *double-shear* steel. Shear steel is used for various articles of cutlery, particularly to form the cutting edge, in which case it is welded to a softer grade to form a tough backing.

CRUCIBLE PROCESS

As shown by the analysis cited above, blister steel is not at all homogeneous, even with the most careful preparation, and consequently under the relatively crude conditions which formerly existed the irregularities in composition were much more pronounced. To overcome this objectionable feature, Huntsman carried out lengthy experiments with the idea of securing uniformity by fusion in small fire-clay pots or crucibles. He was finally successful in 1740, and his original process is still carried on at Sheffield and also serves as the basis of a number of modifications. The process is principally employed for the production of special steels for tools, machine parts, etc., where quality is of the first importance, its cost being prohibitive for ordinary grades, which are supplied by the Bessemer and open-hearth processes. It is also used to a limited extent for making small castings. The modifications have to do with the materials used rather than with the details of the process itself. Of these may be mentioned: (1) the *carburizing fusion method* of melting soft steel or wrought iron with charcoal; (2) the *pig and scrap method* of melting soft steel or wrought-iron scrap with a pure grade of cast iron; (3) the Uchatius or *pig and ore method*, in which ore is added to melted cast iron to reduce its carbon content as desired. The first of these is the one used in the United States.

The crucibles which hold the steel are made either of a high quality of fire clay mixed with a little powdered coke as a binder, known as *clay crucibles* or *white pots*, and used principally in England; or of a mixture of about half clay and half graphite, called graphite crucibles, which are practically the only kind used in the United States and on the Continent. After molding, the crucibles are fired or burnt at a high temperature. Their manufacture requires great care and skill in its details and is a considerable industry in itself.

The furnaces for heating the crucibles may be classed as vertical or horizontal, according to the method of charging. The horizontal type is a regenerative reverberatory furnace (Krupp furnace), resembling an open-hearth furnace, gaseous fuel being employed, and the crucibles standing on the hearth. With the vertical type the fuel may be either gas, coal, or coke. If gas is used, the furnace is regenerative, and consists of a number of rectangular chambers, or *melting holes*, in which the combustion of the gas takes place. There are about 6 to 15 of these chambers to a furnace, each capable of holding 6 crucibles. In coal or coke furnaces, also called *pot holes*, *coke holes*, etc., the crucibles are set directly in the fuel, which is supported by grate bars, a chamber being provided underneath for cleaning.

In the United States the charge is ordinarily 100 pounds, and the graphite crucible weighs about 50 pounds. The material employed is usually soft-steel or wrought-iron scrap, together with the necessary proportion of charcoal and a small amount of oxide of manganese and fluorspar or other flux; if blister steel is used, the charcoal is omitted. The larger pieces are put at the bottom, the charcoal and oxide of manganese poured on these, and the remaining space filled up with the smaller pieces. The cover is then put on, and the crucible set in the furnace. Depending upon the nature of the charge (low-carbon heats, on account of the higher temperature necessary, require a longer time than those high in carbon), the melting, which is the first stage in the process, occupies about two to four hours. When this is complete, the charge is allowed to remain a certain length of time until the steel becomes quiet, i.e., does not evolve any more gas—a result probably due to silicon, reduced by the action of carbon on the wall of the crucible, combining with any oxygen present, either free or existing as oxide, and also conferring on the steel the property of absorbing and retaining a certain amount of gas. This operation is known as *killing* the steel, which, when perfectly quiet, is said to be *dead*, and requires about one-quarter to one and three-quarters hours, usually from one-half to one hour. The total time for a heat is about three to four hours, three heats being made during each *turn* of 12 hours. When ready for pouring, the crucibles are drawn from the melting holes and set on the floor. The covers are then taken off, and the slag floating on top of the steel is largely removed by means of a light iron rod with a ball of clay on one end, against which it chills and to which it adheres. The steel is now poured or "teemed" into the molds, the slag remaining on top of it being kept back by a bar (*flux stick* or *skimmer*) held against it. Each mold receives the contents of one crucible, or, if of larger size, several cruciblefuls are used. Several cruciblefuls may also be poured into a ladle, from which the molds are filled. Ingots, after cooling and before being worked down, may be *topped*, i.e., the tops broken off, to determine the grade from the appearance of the fracture, and also for the purpose of removing the piped portion. Chemical analysis has now almost entirely replaced this optical method for determining the composition. The average life of graphite crucibles is about six to nine heats. In English practice, where clay crucibles are used, the life of a crucible is about three heats, and the charges are reduced successively on account of the *slag* or *flux line* which is left after each melting. The first charge is generally 56 pounds, the second about 44 pounds, and the third 38 pounds. As the crucible is cold for the first heat, this takes about four and one-half to six hours, the succeeding heats taking considerably less time, as the crucible is then hot; three heats are made in 12 hours.

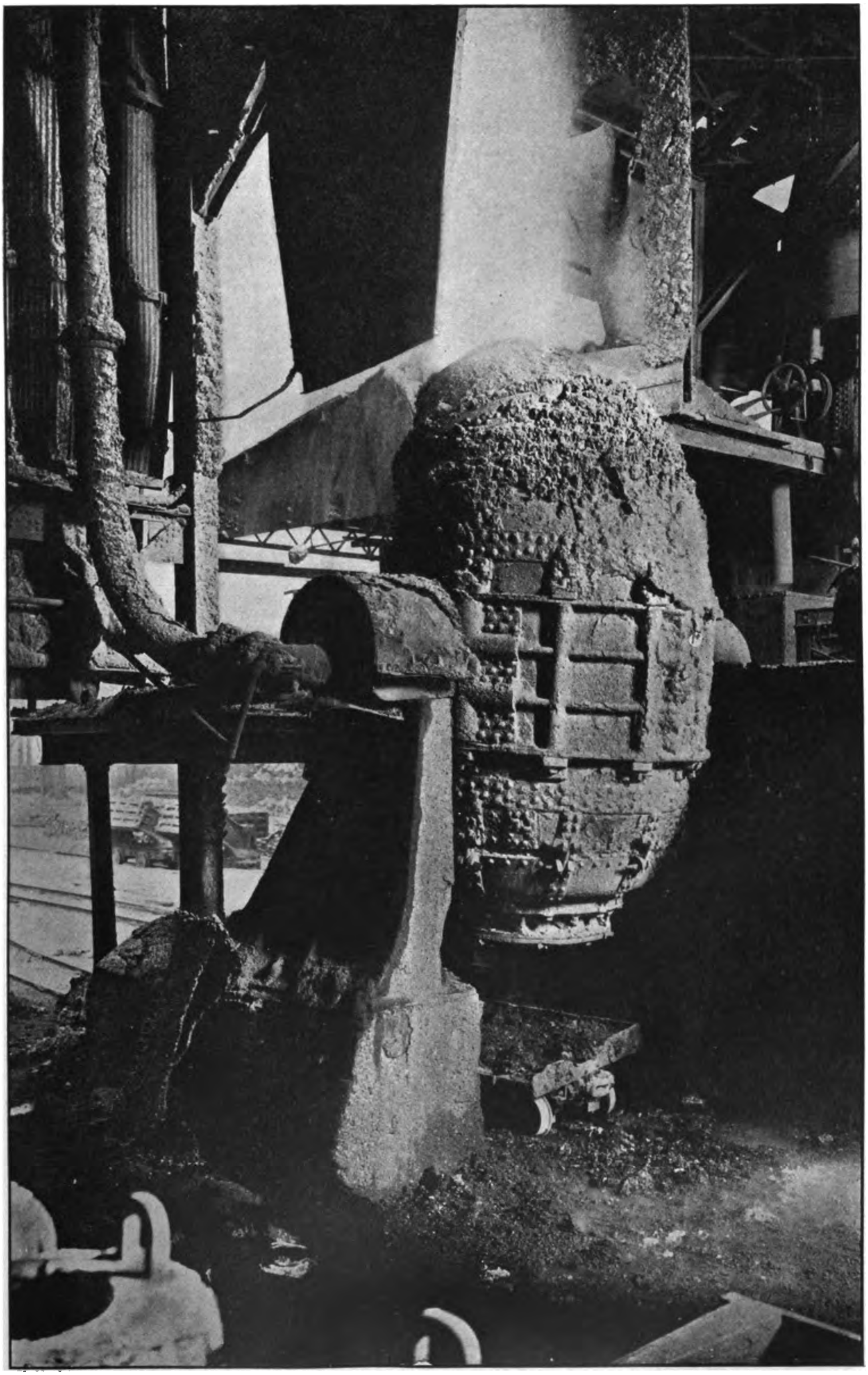
BESSEMER PROCESS

The present era of steel making commenced about 1855 with the advent of Sir Henry Bessemer's process, which he discovered while in search of a better material than cast iron, but not too costly, of which to manufacture ordnance. In the course of his investigation he experimented with a jet of air blown through molten cast iron. The use of air and steam had been tried before, but not exactly in the same manner. He introduced the air by means of a small clay tube passing through the lid of a crucible and reaching almost to the bottom. The crucible was placed in a furnace in order to melt the cast iron it contained and also to supply the heat necessary to keep it in this condition in view of the strongly cooling effect which it was supposed the air would have. When this experiment was actually performed, it was found that the air, instead of lowering the temperature, greatly increased it, and that after the metal was once molten no external source of heat was necessary. This phenomenon is due to the large amount of heat generated by the *rapid* combustion of the silicon, carbon, and manganese which the cast iron contains. It is stated that William Kelly, in the United States, discovered and applied the fundamental principles at an earlier date, and this is apparently borne out by the fact that the Patent Office, some years afterward, allowed his claims for the extension of his patent.

In 1856 Bessemer read before the Royal Institution his now famous paper entitled "On the Manufacture of Steel without Fuel." The method described appeared to be such a radical departure that it was not fully accepted until it had been actually demonstrated. When, however, the attempt was made at various works to put it into practice, it resulted in complete failure, the reasons for which now seem obvious. It required several years of laborious research to determine that with pig iron low in manganese the blown metal would be *red-short*, i.e., would crack and crumble when worked hot, owing to the presence of a large amount of oxide of iron; and that if the metal were high in phosphorous it would be *cold-short*, i.e., brittle when cold, owing to the presence of this element, none of which is removed by the original (acid) method. These facts had not been discovered in Bessemer's earlier experiments, as the cast iron used was low in phosphorus and contained a fairly high percentage of manganese. The final success of the process is due in great measure to Robert Mushet, who discovered that either a grade of pig iron rich in manganese or spiegel added to the blown metal would effect its deoxidation. Göransson, in Sweden, was also largely responsible for its ultimate adoption, being the first to operate it successfully on a commercial scale. It is also sometimes called the *converting*, *pneumatic*, or more rarely, *air-refining* process. It may be defined as a process for the production of steel, consisting in blowing cold air through molten pig iron contained in a suitable vessel, whereby certain impurities are oxidized and removed, and the product obtained in a fluid condition.

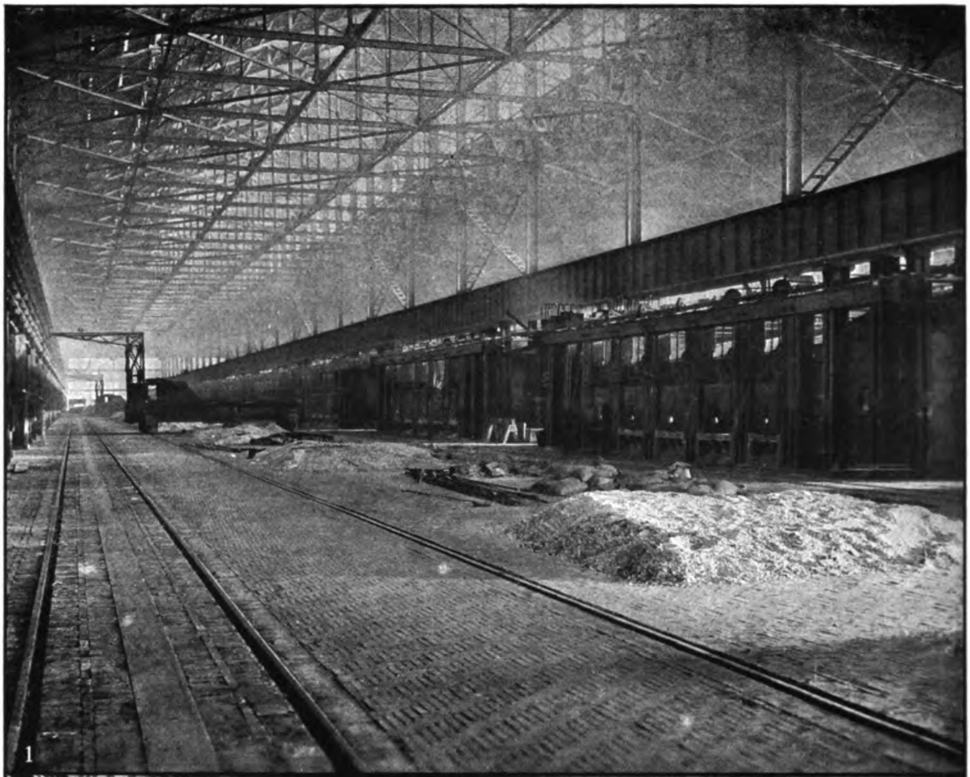
Depending upon the nature of the lining of the vessel, there are two modifications: (*a*) the *acid Bessemer process* (the original, and hence called simply the *Bessemer process*), by which nearly all of the silicon, carbon, and manganese are eliminated, the phosphorus and sulphur, however, remaining unaffected; and (*b*) the *basic Bessemer process* (due to S. G. Thomas, aided to some extent by P. C. Gilchrist, hence sometimes called the *Thomas-Gilchrist*, or, on the Continent, simply the *Thomas process*), in which there is elimination of nearly all of the silicon, carbon, and manganese, as in the acid process, and, in addition, most of the phosphorus and part of the sulphur.

The *vessel* or *converter* is shaped like an egg or a pear, the bottom or rarely (except for foundry work) one side of which is perforated with a number of small holes through which a powerful blast of air enters and passes through the bath of metal, thereby oxidizing the impurities, which go into the slag if solid, or out of the mouth of the converter if gaseous. After the oxidation of the impurities the bath contains a certain amount of oxide and free oxy-



BESSEMER CONVERTER BLOWING A HEAT OF STEEL

IRON AND STEEL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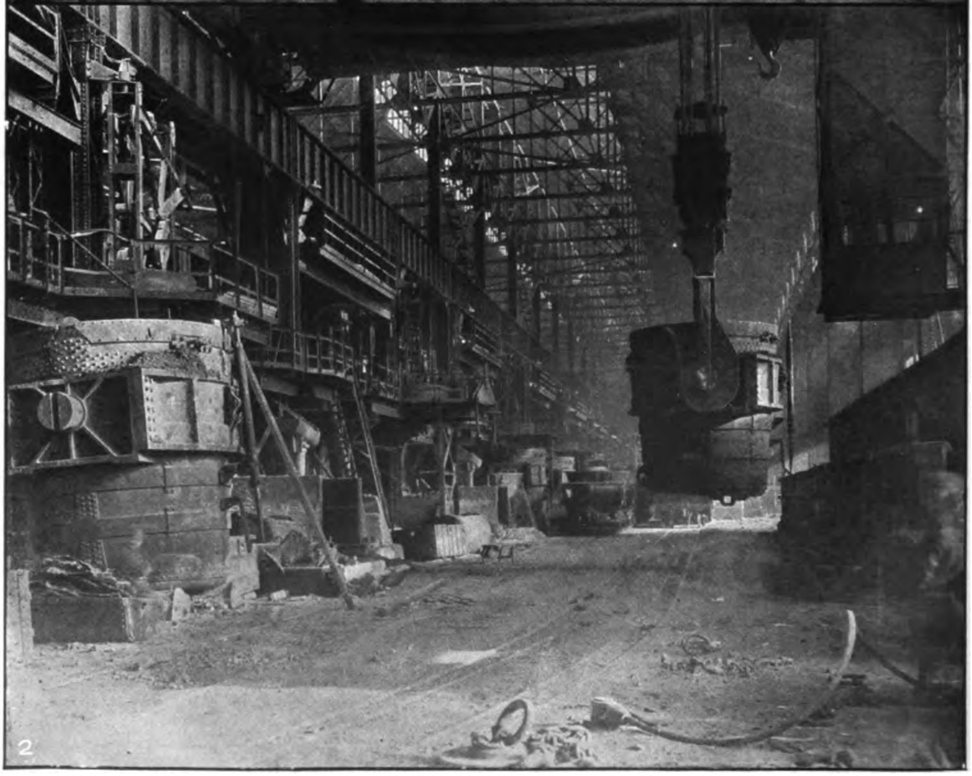
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AN OPEN-HEARTH STEEL PLANT

THE EDGAR THOMSON OPEN-HEARTH STEEL PLANT OF THE CARNEGIE STEEL COMPANY.
It embraces 14 furnaces with a capacity of 80 to 100 tons each

1. CHARGING FLOOR SHOWING CHARGING MACHINES
2. TAPPING SIDE OF FURNACES, WITH LADLE IN FOREGROUND AND POURING PLATFORM ON

gen, which are removed principally by manganese in some form, and the composition adjusted as desired.

The equipment of a modern plant, particularly as regards American practice, consists essentially of usually two to four converters, with the necessary appliances for handling the molten pig iron, the finished steel, etc.; large auxiliary vessels or *mixers*, in which molten metal from the blast furnaces is stored, or, if cold pig is used, cupolas for melting it as well as the spiegel, if rail steel or a similar grade is to be manufactured; and powerful blowing engines for supplying the blast. The operation of the vessels is controlled by a *blower* stationed on a platform or *pulpit* a short distance away, where he can see all that is going on. There are also pouring platforms, storage yards, etc.

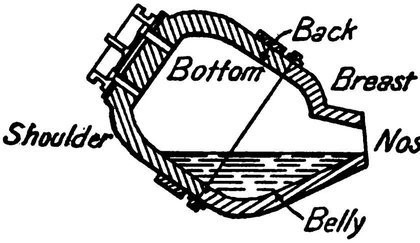

FIG. 8. BESSEMER CONVERTER.
Vertical section.

The converter (see Fig. 8) is lined with either acid or basic material, according to the method that is to be employed, and is suspended, at a little above the centre of gravity, by trunnions so that it can be tilted through various angles. In the original form, now little used, it was set on a permanent foundation and could not tip. The lining is contained in a steel shell consisting of the following sections: the "bottom"; the middle portion, known as the "body" or "belly"; and the upper part or "nose," which is open at the top or "mouth." The blast, at a pressure of about 20 to 25 pounds per square inch, is admitted through the bottom by means of tuyère bricks in each of which are a number of small holes or tuyères; these bricks are set in refractory material or *bottom stuff*, and the whole is held in a suitable casting fastened to the body of the converter by cotter pins.

As the lining of the bottom wears away much more rapidly than that of the body portion, the advantage of the present form, which can be readily removed and replaced by a fresh one, is evident. This was designed by A. L. Holley, who was also responsible for many other important mechanical improvements. The bottom is closed by an iron plate, between which and the tuyères is an open space or *wind box* into which the blast is admitted from a pipe connected with one of the trunnions, which is hollow and is in turn connected with the blast main. In basic practice the refractory bottom portion is called the *plug*, and the tuyère holes are usually formed by ramming burnt lime, mixed with tar or pitch as a binder, around pins which are subsequently withdrawn. For acid vessels the body and nose sections are lined with blocks and pieces of ganister or firestone set in a mixture of moistened ground ganister or quartz together with a little clay to render the mass plastic. In basic practice crushed burnt dolomite, mixed with tar or pitch as a binder, is rammed in between the shell and a temporary wooden form. The bottom and lining must be dried very carefully before use. When a vessel is tipped over on its side or *turned down*, there must be enough curve or belly to bring the level of the molten metal below the tuyères.

Acid Bessemer Process. The vessel, heated from a previous charge or from a fire built within it, is turned down, and the molten pig iron run in. The blast is then turned on, after which the vessel is *turned up*, i.e., rotated to the vertical position. The actual blowing takes about 8 to 12 minutes in the United States and usually over twice as long in England. The changes taking place in the charge are indicated by the character and appearance of the flame issuing out of the nose of the converter. At first practically only the silicon and part of the manganese are burned, and the flame is short and dull in color; after the silicon has been oxidized the carbon is attacked, and the flame becomes longer and of dazzling brilliance. This latter period is sometimes termed the *boil* on account of the copious evolution of carbonic-oxide (carbon monoxide) gas which violently stirs up the metal and, after escaping, burns in the air to carbonic acid (carbon dioxide). As the flame is very trying to the eyes, special dark-colored blowers' glasses are worn in order to observe it. While the carbon is burning, it is long, clear, and brilliant. When the carbon is nearly gone, the flame *drops* or shortens and also becomes full of dark lines, showing that the blowing is finished. The vessel is then turned down, the blast shut off, and the metal *recarburized* (see below) preparatory to pouring it into molds.

The heat necessary for the process is derived principally from the combustion of the silicon and carbon. If the pig iron contains too high a percentage of silicon, too much heat will be generated, and the charge is said to *blow hot*. In this case it is necessary to cool the bath, and this is effected by blowing in steam with the blast or, better, by throwing in cold steel scrap, which is low in these elements. If, on the other hand, the iron contains too little silicon, the opposite condition results, and the charge is said to *blow cold*. The vessel must then be turned down so that the blast will strike the surface of the bath. This produces the required heat by the oxidation of some of the metallic iron. The metal is said to have been *blown full* when only traces of carbon remain (about 0.04 or 0.05 per cent); if the blowing is stopped shortly before this point is reached, the metal is said to have been *blown young*. In the United States the capacity of a vessel varies from about 8 to 25 tons per heat, the output of a pair of vessels being about 40,000 to 65,000 tons per month. The use of the converter in the *duplex* process is mentioned below.

Basic Bessemer Process. A certain amount of lime is charged with the molten pig iron, but otherwise the process is conducted in practically the same manner as the acid process until the drop of the flame. At this point, instead of turning the vessel down, the blowing is continued (sometimes after the removal of the old slag and the addition of a little more lime) for about four or five minutes as determined by experience, during which most of the phosphorus and some of the sulphur are removed. The end of the operation is determined by taking a small test ingot, which is forged down while still hot, quenched in water, and broken. The appearance of the fracture and also the malleability of the metal indicate the state of the process. The first period, up to the drop of the flame, is known as the *foreblow*, and the second, the *afterblow*. When ready, the vessel is turned down and the blast stopped, as before. As much as possible of the slag is poured off before recarburizing to prevent an undue amount of phosphorus from being reduced and reëntering the metal. As this action always occurs to a certain extent, the charge must be *blown down*, i.e., the phosphorus reduced to a considerably lower percentage than that permitted in the finished steel. A heat requires about 20 to 30 minutes, and one vessel can produce about 1000 to 5000 tons per month, depending upon the size, which varies from about 15 to 25 tons per heat. As already stated, the basic process is not used in the United States, as the pig iron does not contain a sufficient percentage of phosphorus.

In steel foundries small converters, called "baby" Bessemer converters, with a capacity of about two to five tons, are frequently employed. Various types and modifications, principally as regards the apparatus, have been tried from time to time; but the process itself is essentially the same as described for the acid process, which is practically the only one used in connection with the manufacture of castings, at least those made outside of large steel works.

OPEN-HEARTH PROCESS

This is a process for the production of steel by the oxidation and removal of the excess of impurities contained in a bath of metallic iron lying on the hearth of a regenerative furnace, the product being tapped in a fluid condition. The metallic charge may consist of (*a*) pig iron (either solid or molten); (*b*) pig iron and steel or wrought-iron scrap; or (*c*) steel or wrought-iron scrap and carbon (coal or coke). As in the Bessemer process, there are two modifications, depending upon the nature of the lining of the furnace: (1) the acid open-hearth process, in which nearly all the silicon and manganese, and the desired proportion of the carbon, are removed; (2) the basic open-hearth process, in which there is removal of silicon, manganese, and carbon, as in the acid process, and, in addition, most of the phosphorus and usually also some of the sulphur, but to an uncertain extent.

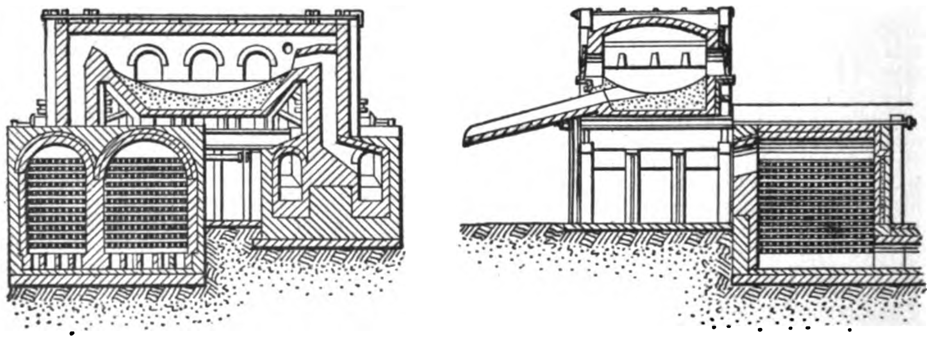

FIG. 9. LONGITUDINAL AND TRANSVERSE SECTIONS OF STATIONARY OPEN-HEARTH STEEL FURNACE.

The process was invented by Sir C. W. Siemens in England and was first used commercially in 1865. The principle of keeping the charge molten throughout the entire operation of purification was not new as applied to reverberatory furnaces, but had previously failed owing to the insufficient temperature obtainable in this type of furnace as then known.

The original (acid) method of Siemens was to melt pig iron alone and oxidize the impurities by additions of ore (*Siemens* or *pig and ore process*), assisted by the oxygen in the furnace gases; it was therefore practically identical with puddling except for the higher temperature which maintained the charge in a molten condition. The brothers Martin, in Sireuil, France, added steel or wrought-iron scrap, without any ore, to molten pig iron until the desired composition was obtained, there being only slight oxidation (and purification) from the gases (*Siemens-Martin, Martin-Siemens, Martin* or *pig and scrap process*). The former was therefore strictly an oxidation process, while the latter was almost solely a dilution process. The various names mentioned have commonly lost their special significance and are used more or less interchangeably, the terms *pig and ore* or *pig and scrap* being employed when it is necessary to distinguish between them. Ordinarily a combination method, with varying proportions of pig, scrap, and ore, is practiced. The term *open hearth* as applied to the process is derived from the type of furnace; it is used universally in the United States and to a certain extent in England.

Open-Hearth Furnace. This is a regenerative reverberatory furnace, the name signifying that the hearth is open or exposed to the action of the flame. It should rather be called a *Siemens* or a *Siemens regenerative furnace*, as is done in England; the name *Martin furnace* (used on the Continent) is incorrect, as the Martins had nothing to do with the design of the furnace, only with the process.

The furnace (see Fig. 9) comprises the following essential features: (*a*) the hearth or *sole*, which contains the charge, covered (*b*) with an arched brick roof; (*c*) *ports* or passages at each end of the hearth, the air and gas for combustion entering through those at one end and the products of combustion leaving through those at the other end; (*d*) the *regenerators* or *regenerative chambers*, nearly filled with *checkerwork*, at each end of and below the hearth; the regenerators at one end are connected with the ports by vertical flues or *uptakes*, and at the other with the chimney or stack by horizontal flues; at the bottom of the uptakes are (*f*) small chambers or receptacles called *cinder* or *slag pockets*, which can be easily cleaned, to catch any large particles of dirt and slag carried over from the hearth and thus prevent their entering and clogging up the checkerwork. The hearth of a modern furnace is constructed of steel plates, covered first with silica bricks, on top of which is the lining proper, consisting of (*a*) for acid practice, silica bricks with fine sand, burnt or sintered into place; (*b*) for basic practice, magnesite bricks covered with crushed dolomite, sometimes mixed with a little pitch or tar to serve as a binder. The roof and walls, above the level reached by the slag of the bath, are built of silica (rarely magnesite) bricks, and below this of silica (acid) or magnesite (basic) bricks, according to the nature of the process. Sometimes chrome (neutral) bricks are inserted between the silica and the magnesite bricks in the walls and lining. The hearth is provided with a tap hole through the back wall, which in the case of stationary furnaces must be closed up carefully with refractory material of the same kind as the lining; with a tilting furnace this hole, except when tapping, is above the level of the bath and so need not be closed up tightly. The hearth is usually rectangular in shape, rarely round or oval. The regenerators are the distinctive feature of the furnace and consist of fire-brick flues filled with bricks set on edge and arranged in such a way as to have a great number of small passages between them, called, on account of the fancied resemblance, *checkers* or *checkerwork*, which abstract most of the heat from the outgoing waste gases and return it later to the incoming cold gases for combustion, on the same principle as the stoves of a blast furnace. On account of the system of heating, only gaseous fuel, or fuels having the same general character, can be employed. In the case of producer gas, both the air and gas are preheated in separate regenerators, uniting and burning only after they have entered the furnace; with natural gas, petroleum, or powdered coal, only the air is preheated; they are introduced near the ports, the two latter being injected with air or steam.

The furnace may be built either on a permanent foundation, when it is termed a *stationary* or *fixed furnace*, or else arranged so that the portion comprising the hearth may be tipped, when it is known as a *tipping* or *tilting furnace*.

In the United States, steel-works furnaces, i.e., those of large size intended for the manufacture of ingots, generally have a capacity per charge of about 50 to 100 gross tons, the usual size of furnaces constructed recently being about 70 to 100 tons; for some special processes they may have a capacity up to 250 tons or over, and in this case are of the tilting variety. Smaller furnaces of about 10 to 20 tons' capacity are generally confined to use in steel foundries. In ordinary practice a heat requires about 6 to 12 hours, usually 7 to 10 hours, and a furnace will make about 12 to 22 heats per week of six days, depending somewhat upon the size, a large furnace, as a rule, requiring more time for a heat. The furnaces were originally charged by hand, the material being laid on a spadelike instrument, called a *peel*, which was rested on the sill of one of the doors and then pushed into the furnace. With large modern furnaces, however, charging is done by means of a machine. The stock for the charge is loaded into steel boxes, which are picked up by the *peel* of the machine, pushed into the furnace, revolved to deposit their contents, and then withdrawn.

Acid Open-Hearth Process. Ordinarily the charge is composed of pig and scrap, the latter, as a rule, forming the greater part, up to about 60 or 70 per cent. As in the acid Bessemer process, the materials must contain less phosphorus and sulphur than is permissible in the finished steel, as there is no elimination of these elements, and in the case of sulphur an additional amount may be taken up from the gases. In some cases the scrap is charged first, and the pig placed on top; in others this order is reversed. The first stage consists in melting the materials down, during which much of the silicon, manganese, and carbon are oxidized and eliminated. When completely melted, the bath should contain about 0,60 per cent carbon for low-carbon steel; and slightly over about 1 per cent for high-carbon steel when the carbon is secured principally from that in the bath without any considerable final addition. To determine the condition of the bath a sample is taken out in a long-handled spoon and poured into a small iron mold. The test ingot so obtained is removed immediately, quenched in water, and broken, the appearance of the fracture giving the desired information. In foreign practice the test ingot is usually forged down before quenching and breaking. Frequently when making high-carbon steel, say, over about 0.50 per cent, a rapid chemical determination for carbon is made.

If the heat *melts high*, i.e., if the percentage of carbon is still too high, ore in small amounts is fed in to hasten its oxidation, an operation termed *oreing*. Under these conditions there is little danger of corroding the lining owing to the protection afforded it by the metallic bath and the slag already formed. If, on the contrary, the heat *melts low*, with the consequent danger that the bath will not be hot enough by the time the carbon has been oxidized to the necessary extent, a certain amount of pig (which is high in carbon) is thrown in to supply the deficiency in this element, and this is known as *pigging* or *pigging back*. If the carbon has been eliminated too soon, and there is only slight agitation of the bath, owing to the small amount of carbon dioxide being evolved, there is danger of chilling, as sufficient heat cannot be absorbed by the metal through the relatively nonconducting blanket of slag. A certain amount of heat is furnished by the oxidation of the carbon and impurities, but the greater part necessary (owing to the slowness of the process, as referred to in connection with the Bessemer process) must be secured from the combustion of fuel. Contact of the metal with the hot gases, by which its heating is effected, is brought about indirectly by the oxidation of the carbon in the metallic bath itself, which causes it to bubble and seethe. Consequently, as mentioned above, it is essential at all times to have a certain proportion of carbon in the bath, as otherwise it would become too cold to tap. The temperature of the bath is usually determined partly by the eye (protected by blue glasses) and partly from the melting effect on a low-carbon steel bar submerged in the bath for about 10 seconds. If the bar is melted off almost squarely across, the bath is hot enough, while if there remains a long tapering point it is still too cold. The direction of the air and the gas is reversed, by changing the valves, at regular intervals of about 20 minutes at the beginning, and 15 minutes or less towards the end of the heat. Just before tapping, a small amount of ferromanganese, containing about 80 per cent of manganese, is usually thrown into the bath to *hold the heat*, i.e., to prevent any further removal of carbon and also to effect a partial deoxidation by its own oxidation.

There are two methods for obtaining the desired carbon content in the finished steel: ((*a*) by removing nearly all the carbon and adding the proper amount at the end; (*b*) by eliminating it only to the desired percentage ("catching the carbon on the way down") and then tapping immediately. In either case manganese, and usually a slight amount of silicon, must be added (generally in the ladle) to remove the remaining oxide from the metal.) When the bath is in the right condition, both as to composition and temperature, it is *tapped* by knocking out the material in the tapping hole, if the furnace is stationary, or by tilting the furnace, if it is of that type, so that the metal can flow out.

Basic Open-Hearth Process. The charge is much the same as for the acid process, except that it is not limited in its phosphorus content; the sulphur, however, should be reasonably low, as its elimination is rather uncertain; the silicon should also be low to avoid the use of an excessive amount of lime, and also since its oxidation is not depended upon for the necessary heat. The limestone and ore to form the basic slag and to assist in the oxidation are charged before the metallic portion, as in this case there is no danger of excessive corrosion of the lining, since it is also basic in character; the actual elimination of the phosphorus and any sulphur is due to the lime. The limestone is generally employed in its natural condition, but is occasionally burnt beforehand. With these and certain other minor differences, the basic process closely resembles the acid in its operation. The proportion of pig is commonly larger and, whenever practicable, is charged in the molten condition direct from the blast furnace or mixer, as a considerable saving results.

Special Open-Hearth and Combination Processes. Certain special modifications have been adopted with a view to decreasing the cost, increasing the output, or making use of material otherwise difficult to treat, e.g., high-phosphorus pig.

Bertrand-Thiel Process.—This process was worked out about 1894 at the works of the Prager Eisenindustrie Gesellschaft at Kladno, Bohemia, by Ernst Bertrand and Otto Thiel, and was designed for use with pig iron too high in phosphorus (about 1 to 2 per cent or over) for convenient treatment according to ordinary practice, but which was still too low in this element for the basic Bessemer process. It consists in charging pig, either alone or mixed with scrap, in one basic furnace run at a relatively low temperature, in which nearly all the phosphorus and silicon, and only a small part of the carbon, are removed; this part of the process closely resembles *pig washing*. The resulting partly purified metal, without the slag, is then immediately transferred to another basic furnace in which scrap or ore, or both, together with some lime (occasionally also a little additional pig), have previously been heated. A very rapid reaction at once takes place between the iron oxide and the carbon and remaining impurities in the metal, which are speedily reduced below the required limits. The further details are the same as in regular practice. The time for a charge is about two to four hours in each furnace, depending largely upon the size of a charge.

Monell Process.—This is a modification of the pig and ore process in which steel scrap may also be used, and was devised by Ambrose Monell at the Homestead Steel Works of the Carnegie Steel Company. It is usually carried out in a fixed basic furnace, but is equally applicable to a tilting furnace. It consists in heating lime and ore or some other form of iron oxide, the latter amounting to about 20 to 25 per cent of the pig, until they become pasty. When this has occurred, the pig in a molten condition is run in, and a violent reaction takes place. A large quantity of slag is formed, most of which runs out of a special notch in the back wall of the furnace, if stationary, into an auxiliary cinder pit, or by tilting the furnace, if of that variety, so that it can run out of the tapping hole. This first slag contains about 90 per cent of the phosphorus and most of the silicon originally in the pig, while at this point about 2 per cent of the carbon still remains in the bath owing to the initially relatively low temperature. The heat is then worked down and handled as in regular practice, requiring about the same time as an ordinary pig and scrap heat.

Talbot Process.—This is also a pig and ore process, although scrap is occasionally added, but principally as a means of disposing of it. It was originated by Benjamin Talbot about 1897 at the Pencoyd Iron Works, near Philadelphia. It depends upon the rapid oxidation of the impurities contained in molten pig iron by a liquid, highly ferruginous slag, and is carried out in a basic furnace, generally of the tilting type. The essential point is always to keep a certain amount of metal in the furnace for the purpose of (*a*) diluting the impurities contained in the subsequent additions of pig iron, and (*b*) furnishing a reservoir of heat to enable a very fluid slag to be maintained. A tilting furnace of about 250 tons' capacity or over is ordinarily employed, and about one-quarter to one-third of the finished steel is tapped out at one time. This having been done, additions of ore or other form of iron oxide and lime are made, and after they are thoroughly melted and incorporated with the former slag, the proper amount of molten pig iron is run in. This occasions a violent reaction, and most of the phosphorus and silicon is eliminated in a few minutes; while this reaction is in progress a large amount of the slag boils up and runs out of the furnace. The bath is then adjusted as in ordinary practice, a portion is tapped out, and the cycle of operations repeated. A furnace is emptied completely only at the end of the week or for a shutdown for repairs. A heat requires about two to four hours.

Duplex Process.—This consists in the combined treatment of pig iron, first in an acid Bessemer converter, and afterward in a basic open-hearth furnace, the object being to obtain the more rapid working of the former and the greater purification characteristic of the latter. Osann in Germany patented the process, which is essentially the same as that used to-day. The blowing in the converter takes about 10 to 15 minutes, and the finishing in the open-hearth furnace about two to eight hours, depending upon the size of the heat and other conditions. As carried out at one works, part of the pig is blown until nearly all of the silicon and the carbon is oxidized, as in ordinary Bessemer practice. This serves as molten steel scrap, and, being highly oxidized, it produces a vigorous reaction with the remainder of the pig, which is blown only sufficiently to remove the silicon, the action being stopped before much of the carbon has been eliminated. The process is completed as usual. Blown metal is sometimes used in the Talbot process to replace part or all of the ordinary molten pig iron.

ELECTROTHERMIC PROCESSES

The term "electric processes," commonly used, is likely to prove misleading to the uninitiated as signifying that electricity per se exerts some peculiar action which confers a special quality on the product. As a matter of fact, in its present commercial application to the manufacture of steel or cast iron, it is chiefly a substitute for fuel as the source of heat. An alternating current is always used, as it can be transmitted at a high voltage, with lower cost of conversion to the required voltage than is possible with a direct current; in the case of induction furnaces a direct current is out of the question. Electrolytic methods, such as are employed for the refining of copper, by which the material is chemically decomposed or split up, require a direct current and have been applied to the production of iron only when it is desired to have the metal as pure as possible for experimental purposes and in very small quantities, the cost of these methods being prohibitive for general purposes. Electrothermic processes may be classified according to the type of furnace and the method of heating employed; another classification would depend upon the nature of the operation, such as smelting, refining, carburizing, etc.

1. **Arc Furnace.** The requisite temperature is obtained by radiation from an arc formed between two electrodes, or between one or more electrodes and the charge, either initially in solid lumps (between which small arcs may also be formed) or molten. When the charge is molten, the current may pass from one electrode into the bath, then out again to another electrode in series with the first, or else out through the bottom of the hearth which then contains one of the electrodes; a certain amount of heating by resistance also occurs, and to indicate this fact the term *arc-resistance heating* (or *furnace*) is sometimes employed.

2. **Induction Furnace.** This is based on the principle of an electrical transformer. It consists of an annular trough, or two or more such troughs connected together, which constitute the hearth, the contained metal acting as the secondary circuit of a transformer, the primary circuit of which is arranged as usual. The heat is obtained from the resistance offered by the metal itself to the transformed current of very high amperage and low voltage.

3. **Resistance Furnace.** The charge or bath of metal forms part of the circuit, and the resistance it offers to the passage of the current yields the required temperature.

4. **Surface-Resistance Furnace.** Here the electrodes do not at first suffice for the passage of the current. To heat up the furnace it is necessary to connect them by means of some kind of conducting material, such as a bed or lining composed of or containing pieces of carbon. These conductors by their resistance to the passage of the current are highly heated and form a melting hearth upon which are placed the materials to be treated. The charge itself subsequently becomes a conductor between the electrodes.

The steel-making furnaces are practically always lined with basic material, so that purification with lime can be effected; however, for smelting ore they are frequently lined with fire bricks similarly to blast furnaces.

The first metallurgical use of electricity for heating purposes, of which we have definite record, was an experimental demonstration in 1810 by Sir Humphry Davy. Other investigators were Pepys (1815), welding; and Pichon (1853), electrothermic furnace. In 1878–79 Sir William Siemens, the inventor of the open-hearth furnace, took out patents for electric furnaces of the arc type which possessed most of the important details of the present arc furnaces. He employed an ordinary crucible to hold the charge, one electrode being introduced through the bottom and the other through the cover or at the top, this latter electrode being adjustable. In a later form the electrodes were introduced through the sides at points directly opposite each other. Other patents were taken out from time to time. The adoption of the more widely known furnaces at present in use has occurred chiefly since the beginning of this century.

The *Stassano furnace* is of the arc type (see Fig. 10) and is nearly cylindrical in cross section. It usually rotates about a vertical axis slightly inclined from the perpendicular; it may, however, be stationary. It is provided with three or more large cylindrical electrodes inserted through the sides, nearly meeting at the centre, and connected with a three-phase alternating current. The furnace is generally lined with magnesite, and the molten products are tapped out at the bottom. This type of furnace has been principally used to produce steel directly from the ore, but pig and scrap may also be employed as in ordinary steel-making processes. By the former method finely

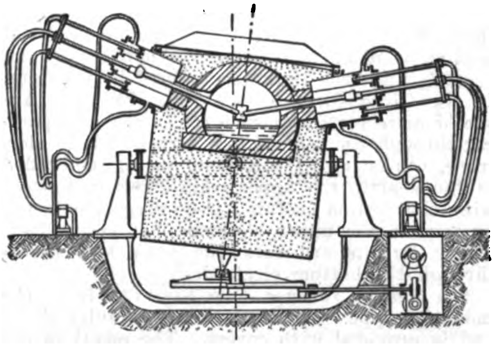

Fig. 10. STASSANO ELECTRIC FURNACE. Vertical section.

ground ore, with the correct proportion of carbon and flux, is first molded into briquettes. The rotation of the furnace is to effect a thorough mixing of the charge.

The *Héroult* and *Girod furnaces* are both tilting and closely resemble this variety of furnace as used in the open-hearth process except that they are much smaller. Since no gas is to be preheated or burned, there are no ports, regenerative chambers, or stack. Working doors, which also serve for charging, are provided in the front of the furnace. While the method of heating for these two furnaces is the same, the manner of introducing the current differs. In the Héroult furnace (see Fig. 11) there are at least two vertical carbon electrodes passing through the roof, their height being regulated by a suitable device. These are connected in series, the current flowing from one to the other after traversing the bath. The ends are lowered into the slag covering to form the circuit and are then usually raised a certain distance, whereby an arc is formed over the space separating each electrode from the bath, as this method of heating is much more effective than simply depending upon the resistance offered by the bath. In the Girod furnace (see Fig. 12) there are one or more vertical carbon electrodes, also passing through the roof, but in series with an electrode, consisting of soft steel pieces, embedded in the hearth, the upper ends being in contact with the molten metal. The current, entering by way of the upper electrode (or electrodes), passes by an arc into the bath and leaves through the bottom electrode.

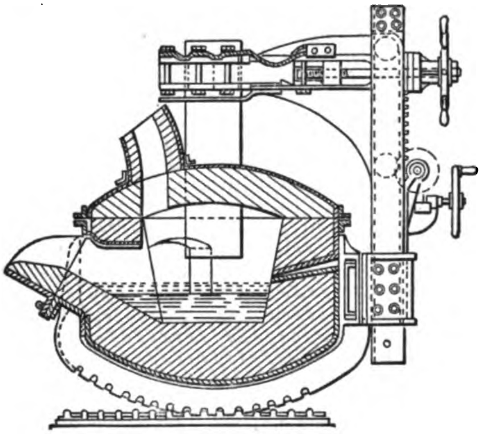

Fig. 11. HÉROULT ELECTRIC FURNACE.
Transverse section.

The *Kjellin furnace* (see Fig. 13) is of the induction type. The hearth is of annular shape and is provided with covers. The metal in the hearth forms the secondary circuit of a transformer, the primary circuit of which consists of a coil of fine insulated copper wire wound around a laminated iron core. The winding is placed on one leg only. It is protected from the heat radiated by the furnace by air spaces and a water jacket. This furnace has generally been used for obtaining steel of any grade from low to high carbon by a suitable mixture of pure pig and steel scrap, with the proper additions of ferrosilicon, etc.; little purification of the charge has been attempted, hence pure materials are used. In starting the furnace the hearth is warmed up by a ring of iron or steel which serves to carry the secondary current. If cold material is charged, only a portion of the bath is poured off at a time, but with the use of molten metal from an open-hearth furnace or a Bessemer converter the hearth can be entirely emptied, as it will be sufficiently hot to prevent chilling.

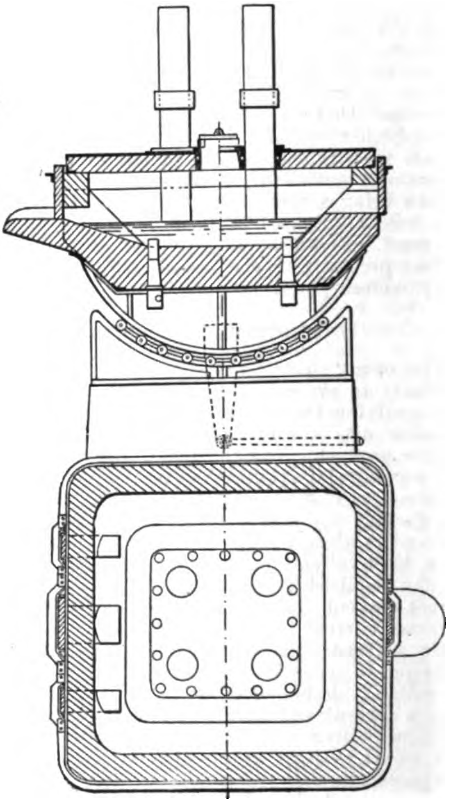

Fig. 12. GIROD ELECTRIC FURNACE.
Plan and sectional elevation.

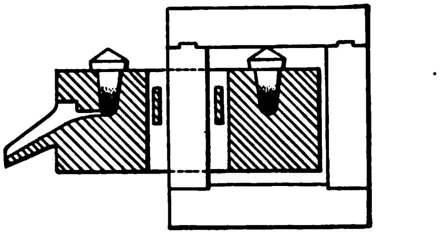

Fig. 13. KJELLIN ELECTRIC FURNACE.
Transverse section.

The *Röchling-Rodenhauser furnace*, also of the induction type, is a modification of the Kjellin furnace devised by Schoenawa and Rodenhauser. In addition to the induced method of heating there are secondary coils of wire about the primary, connected by pole pieces buried in the hearth slightly below the surface. When the refractory lining has been sufficiently heated, it becomes a conductor of high resistance. After the furnace is in regular operation, the heating is consequently a combination of induction and resistance. The hearth, which differs from those of other induction furnaces, varies in form, depending upon whether the furnace is operated with a single-phase or a three-phase current. In the former case it is like two Kjellin rings or hearths joined together to form a figure 8; in the latter case, like three joined together (see Fig. 14). In either case the grooves open into a distinct open hearth, where they intersect, constituting the working chamber or "laboratory," where all the metallurgical operations are effected. The grooves which have a relatively small cross section form the secondary circuits and serve only as heating channels, no purification being performed in them.

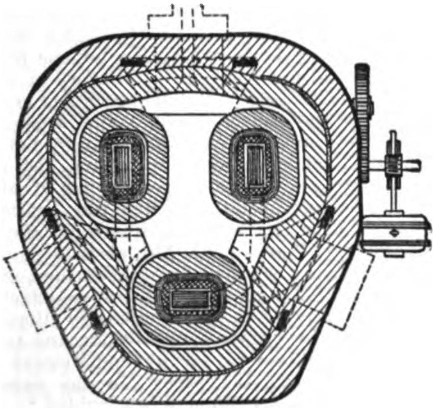

FIG. 14. RÖCHLING-RODENHAUSER ELECTRIC FURNACE. Horizontal section.

The furnaces at present used for steel-making purposes have a capacity varying from about 2 to 10 tons per heat. The length of time required depends principally upon the amount of refining and purification to be done. Materials may be treated in the same manner as by the open-hearth process, but it has been found more advantageous, owing to the high cost, to start with metal initially treated in a Bessemer converter or an ordinary open-hearth furnace, the electric furnace being then employed only for finishing purposes.

Of the furnaces for the production of pig iron it will be sufficient to mention the *Grönwall furnace*, which is in successful operation at Trollhattan, Norway (see Fig. 15). This is a shaft furnace and resembles most nearly an ordinary blast furnace in which the tuyères are replaced by carbon electrodes, three in number. The charge, consisting of ore, coke (or charcoal), and limestone, is introduced at the top by means of a bell and hopper, and the molten products are tapped out through a hole at the bottom of the hearth.

RECARBURIZATION

In all steel-making processes which depend upon oxidation for the necessary purification of the charge the action must usually be carried to such a point that not only is there an insufficient amount of carbon and manganese (and sometimes silicon) remaining, but also a certain proportion of the iron is oxidized and dissolved in the metal itself, which, if allowed to remain, would render it unfit for use. Recarburization (sometimes "recarbonization") means, in its special sense, adding carbon in some form to metal too much decarburized in some steel-making process, to secure the proper percentage in the finished steel; in its more general application the term signifies the addition of all the material needed to give the steel the desired composition as well as to effect its deoxidation. The additions are commonly made cold, generally in the ladle; but if they are in such large amounts that there is danger of chilling the metal, they may be (*a*) preheated to about a cherry red, (*b*) melted, or (*c*) added in the furnace or converter, either wholly or in part. For high-carbon heats a fairly recent method is to add molten pig iron, usually in the furnace, just before or during the tapping of the heat, so that it is thoroughly mixed in while the steel is running into the ladle. The ladle additions are made while the heat is being tapped, and an important point is to get them all in before much slag has appeared on the surface of the metal. In the United States, for soft and medium-carbon heats, the carbon is generally added in the ladle in the form of crushed anthracite coal contained in paper sacks. This is a modification of Darby's method, according to which crushed coal or coke is introduced by means of a hopper and funnel which regulated the rate of flow. Nickel, as nickel steel scrap or ingot nickel, is usually charged at the commencement of the heat, as it is not materially oxidized during the process, at least no more than the iron. Other materials, as a rule, are added towards the end of the heat or else in the ladle, depending largely upon their amount (chilling effect) and any danger of their being excessively oxidized. For the latter reason ferrotitanium and ferrovanadium are put into the ladle after all the other additions.

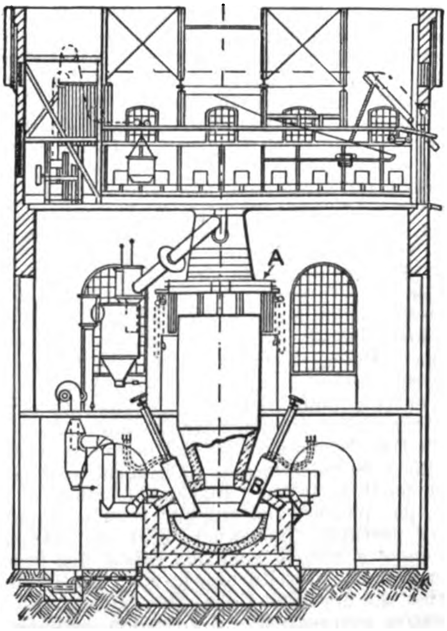

FIG. 15. GRÖNWALL ELECTRIC FURNACE. Vertical section.

INGOTS

The liquid steel, however made, is obtained in suitable shapes, called "ingots," for rolling or forging by casting it in special molds, usually made of cast iron, particularly for ordinary sizes, but sometimes of sand if of large size or for special purposes; recently steel molds have been tried, a longer life being claimed for them, but this has not yet been conclusively shown. The ingots are generally rectangular in cross section and slightly tapering to the top to permit of the removal of the molds. For crucible steel they usually do not exceed a few hundred pounds in weight, while for ordinary structural material they are generally of from 2 to 10 tons, and for special purposes, such as armor plate, they may weigh as much as 100 tons. In the case of crucible steel the pouring is commonly done directly from the crucible, but in the other steel processes the metal is tapped into a *ladle*, a large vessel or pot consisting of a steel shell lined with fire bricks or other refractory material. There is a hole in the bottom closed by a stopper which can be raised or lowered, thus controlling the flow of the steel. For the production of ingots, the steel is usually poured directly into the top of the mold; this method is sometimes objectionable on account of a certain amount of splashing against the sides. Where an ingot with better surface is desired, or in case a sand mold is used whose surface might be cut away by the falling stream, the metal is introduced at the bottom through a pipe or *runner* on the outside of the mold. The molds were formerly set on the floor of a pit, but this method has been largely abandoned, at least in the United States, in favor of car casting. This was devised by F. W. Wood, of the Maryland Steel Company, and consists in setting the molds on small cars or *buggies* on which they can be transported to their destination.

When the steel cools and solidifies, two conditions arise to a greater or less extent, depending upon the attendant circumstances, affecting (*a*) the chemical homogeneity and (*b*) the physical structure or soundness. As discussed under METALLOGRAPHY, steel when slowly cooled is made up of a number of distinct constituents, much as in the case of composite rocks. During cooling those constituents or elements whose combination with iron reduces its melting point segregate or separate out in the still liquid portion near the top of the ingot or casting, becoming more and more concentrated as the remainder freezes. Chemical analysis of such portions shows a higher percentage of carbon, phosphorus, and sulphur than is found in other portions. Somewhere near the bottom of the ingot a reverse condition exists, due to such elements or constituents leaving the steel to enrich the upper portions; this latter is termed *negative segregation*. Segregation may be reduced by different means, such as rapid cooling, the use of small sections, and the addition of certain deoxidizing substances, e.g., silicon or aluminium, but is never wholly prevented, although in many cases it is revealed only by the aid of the microscope. The evolution of gases during solidification may have a beneficial effect, by keeping the still molten metal stirred up.

Solidification naturally takes place first in the portions in contact with the wall of the mold and gradually proceeds inward. As contraction also occurs, since the metal occupies a smaller volume the lower the temperature, there should result eventually a hollow space or cavity, termed a *pipe*, situated in the upper central portion of the ingot. Most of the gases dissolved by the metal when molten are evolved during freezing, and any which cannot escape freely, owing to the metal having become pasty, are mechanically held in little pockets or cavities, called *blowholes*. The space occupied jointly by the pipe and the blowholes may, in general, be taken as equal to the difference in volume of the steel when respectively molten and cold (solid). Hence, with a large number of blowholes, there may be no pipe, and the maximum amount of pipe can be present only in the entire absence of blowholes. The absence of both these defects is necessary to secure sound steel. The simplest and, as a rule, the most satisfactory method for arriving at this result is to eliminate the blowholes by proper manipulation and treatment and then remove (*crop*) and discard the portion containing the pipe. In the case of regular castings an extension is provided to contain the pipe, called the *sinkhead*, which is subsequently machined or broken off.

Special methods may be divided into chemical, mechanical, thermal, and a combination of two or all of these. Blowholes are prevented by the removal of gases either chemically, by the use of *deoxidizers* or *degasifiers*, which may also have some effect in causing the steel to retain a certain amount of gases when cold; mechanically, by applying pressure during solidification which will also serve to eliminate the pipe, also by agitating the steel while molten, thereby assisting the gases to escape. So many different processes and methods have been suggested and tried that only a few can be mentioned here. *Brinell* regulated the number and position of the blowholes and the amount of pipe by means of the manganese and silicon contents. *Allen's agitator*, consisting of two arms fastened to a vertically revolving shaft, was intended to stir up the steel in the ladle to secure thorough incorporation of the additions, but it was also found to disengage a considerable amount of the dissolved gases. *Fluid compression*, also called *liquid* or *plastic compression*, as the name signifies, consists in applying pressure to the ingot during solidification which, to be effective, must be sufficient to expel the gases given off and to follow up the contraction of the metal in cooling so that no pipe or other cavities can form. *Whitworth* casts the steel in a cylindrical mold with vertical walls, a hydraulic plunger then being forced down on the top of the ingot. *Williams* and *Lilienberg* attack the ingot from the side in much the same manner. In *Harmet's process* a tapered ingot is driven upward in a tapered mold. *Centrifugal casting*, consisting in rotating or revolving the molds after pouring, has a somewhat similar effect, but to a less degree, as the pressure is not nearly so great. *Sebenius* pivoted the molds on swinging arms attached to and rotated by a vertical shaft. In *Stridberg's modification* the mold was rotated about its longitudinal axis. Pressure applied by steam or volatile substances within a closed mold have been suggested by *W. R. Jones* and *Bessemer* respectively. *Talbot's method* consists in rolling the ingot before the centre has completely solidified. Retardation in the cooling of the upper portion of the ingot, as compared with the lower portion, is the principle upon which many processes have been based, with the idea that as soon as any pipe forms it will be filled up with liquid steel. Methods to retard cooling at the top consist in a refractory lining at the upper part of the mold; keeping the mold full by the overflow of steel from one mold to the next (*Sauveur method*); covering the top of the ingot with molten slag, covered in turn with fuel which is kept ignited by a blast of air (*Hadfield method*); having the ingot of greater cross section at the top; heating the top of the ingot by means of an electric arc or the effect of powerful induced currents on the principle of an electric induction furnace (see above); the use of *thermit* (a mixture of powdered aluminium and a metallic oxide whose reaction generates a very high temperature), formerly introduced near the top to keep the metal molten, but more recently near the bottom to secure reduction of any oxides in the steel and to assist the escape of gases by keeping the still molten metal stirred up; increasing the rate of cooling at the bottom by increasing the thickness of that portion of the mold wall, and reducing the thickness at the top, also increasing the cross section of the ingot at the top (*Gathman method*). There are, or may be, various combinations of the above.

COMPARISON OF STEEL

Difference in the quality of steel made by different processes may be due either to the process itself or to the raw materials used and the care with which the process in question is conducted: this latter cause is too frequently overlooked. Where the highest quality is necessary, e.g., for tool steel, the price is sufficient to permit of special selection of the raw materials and of attention to the smallest details. Where, however, as in the case of structural materials, moderate excellence is sufficient, a considerable variation in the choice of raw materials and the general practice is possible. But it should be noted that the proportionate degree of excellence of the respective materials for the purpose intended may be (and usually is) greater in the second case than in the first. As ordinarily conducted, the order of merit is usually considered to be: (1) crucible; (2) electric; (3) open hearth; (4) Bessemer. The two first are generally employed for the production of special material, and the two last chiefly for the great proportion of the tonnage consumed for general purposes.

PHYSICAL PROPERTIES AND THE EFFECT OF VARIOUS ELEMENTS

Iron, either pure or in combination with different elements, is capable of a wider range in physical properties than any other known substance, depending upon the composition and also to a large extent upon its physical condition. (See METALLOGRAPHY.) When chemically pure, in which form it is practically never used owing to the cost, it has a moderate tensile strength of about 40,000 pounds per square inch, with relatively high ductility and good conductivity for electricity and heat. With increasing proportions of other elements, at least to a certain extent, particularly of carbon, its strength and hardness are progressively increased, and its ductility and conductivity decreased. Changes in its properties may also be effected by suitable treatment, either physical or thermal. For example, by drawing and treating, special piano wire has been obtained with a tensile strength of slightly over 460,000 pounds per square inch. The usual grades of structural steel have a tensile strength of between 50,000 and 70,000, with a carbon content of about 0.12 to 0.30 per cent; machinery steel and forgings, between 60,000 and 90,000, with about 0.25 to 0.55 per cent of carbon. Alloy steels, containing one or more of the elements nickel, chromium, vanadium, etc., usually also heat-treated, generally show from about 100,000 to 150,000 pounds' tensile strength or over. Further information will be found under STRENGTH OF MATERIALS.

Ordinary steels contain up to about 1 per cent of manganese, and in some cases even up to 1.5 per cent, without the resulting decrease in ductility destroying their commercial value. Above this, up to about 7 per cent, the material is rendered excessively brittle. When, however, the content is between about 7 and 15 per cent, a remarkable change occurs, for the metal, while increasing in hardness, may, by rapid cooling, be rendered tough and ductile. Its great hardness, in the sense of resistance to abrasion, is such that grinding must ordinarily be employed when any finishing is required. This material is known as "manganese steel" and is used for pulverizers, rock crushers, etc. In cast iron its effect is to retain the carbon in the combined condition and to permit of a higher percentage in the iron. Phosphorus tends to cause *cold shortness* (brittleness when cold), and sulphur

WORLD'S PRODUCTION OF 'PIG IRON AND STEEL, 1911

COUNTRY	METRIC TONS	
	Pig iron	Steel
Austria-Hungary	2,095,000	2,363,008
Belgium	2,046,280	1,537,000
Canada	837,558	880,278
France	4,426,469	3,680,613
Germany	15,280,527	15,019,333
Italy	235,000	646,500
Russia	2,865,000	2,519,000
Spain	353,500	228,230
Sweden	633,800	456,500
United Kingdom	9,874,620	6,565,321
United States	24,027,940	24,054,918
All other countries	535,000	325,000
Total	63,210,694	58,275,701

ANNUAL PRODUCTION OF IRON ORE IN THE UNITED STATES

YEAR	GROSS TONS		
	Lake Superior region	Elsewhere	Total
1910	43,442,397	13,572,509	57,014,906
1911	32,793,130	11,083,422	43,876,552
1912	48,221,546	6,928,601	55,150,147

red shortness. This, however, is when these elements are in appreciable amounts, say, over 0.1 to 0.2 per cent, except in certain cases when it may be necessary to keep them much lower.

PRODUCTION OF PIG IRON ACCORDING TO FUEL (UNITED STATES)

FUEL USED	GROSS TONS			
	1910	1911	1912	1913
Bituminous (chiefly coke)	26,257,978	23,141,296	29,132,733	*30,348,973
Anthracite and coke	628,579	212,548	236,467	277,347
Anthracite alone	20,503	17,027	10,712	....
Charcoal	396,507	278,676	347,025	339,981
Total	27,303,567	23,649,547	29,726,937	30,966,301

* Includes small quantities of pig iron and ferro-alloys made with coke and electricity, etc.

A certain amount of phosphorus is desirable in steel for thin sheets to prevent them from sticking together when rolled in a *pack;* sulphur in combination with manganese, as manganese sulphide, enables steel to be more readily machined, particularly when low in carbon, without injury to its other properties. Silicon increases the strength, and to a certain degree the ductility, of steel. The effect of these last three elements upon cast iron has been mentioned in connection with the product of the blast furnace. Oxygen, as oxide of iron dissolved in steel, is injurious except in very small proportions, rendering the metal both red short and cold short. Nitrogen and hydrogen may be absorbed or occluded to a considerable extent, particularly when the metal is molten. Their effect when cold, if present to any marked degree, is to induce brittleness.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESS (UNITED STATES)

YEAR	GROSS TONS				
	Bessemer	Open hearth	Crucible	Electric and all other	Total
1900	6,684,770	3,398,135	100,562	4,862	10,188,329
1905	10,941,375	8,971,376	102,233	8,963	20,023,947
1910	9,412,772	16,504,509	122,303	55,335	26,094,919
1912	10,327,901	20,780,723	121,517	21,162	31,251,303
1913	9,545,706	21,599,931	121,226	34,011	31,300,874

PRODUCTION OF ALL KINDS OF IRON AND STEEL IN FINISHED ROLLED FORMS IN THE UNITED STATES

YEARS	Iron and steel rails. Gross tons	Plates and sheets, except nail plate	Wire rods. Gross tons	Structural shapes, not including plates	Nail plate. Gross tons	Bars, skelp, and all other forms	Total. Gross tons
1890	1,885,307	809,981	457,099	....	251,828	2,618,660	6,022,875
1895	1,306,135	991,459	791,130	517,920	95,085	2,487,845	6,189,574
1900	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1905	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,015
1910	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,039,171
1912	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,841
1913	3,502,780	5,571,037	2,464,807	3,004,972	•37,503	10,030,144	24,791,243

By *alloy* or *special steels* is meant those which owe their properties chiefly to the presence of some element other than, or in addition to, carbon or the usual amounts of manganese. The general effect is considerably increased strength and elasticity, combined with equal or greater ductility than is possible with ordinary or *carbon steels.* So far the greatest application has been for nickel steel containing from 3 to 4 per cent of nickel, particularly for important bridge work such as the St. Louis Municipal Bridge, the Quebec Bridge, and others. *High-speed* or *self-hardening steel* was discovered by Mushet and owes its peculiarities principally to tungsten, molybdenum, and chromium, usually now with a little vanadium, and very recently with cobalt (*cobalt steel*). Its importance is due to its use for machine tools which retain their cutting edge even when heated to a dull red by the friction of the chip which is removed. Other combinations with chromium—chrome-nickel, chrome-nickel-vanadium, etc.—are largely employed for parts of machines, engines, and automobiles which are subjected to severe stresses and shocks. They must, as a general proposition, receive a special heat treatment to develop their best qualities.

Consult: H. H. Campbell, *Manufacture and Properties of Iron and Steel* (4th ed., New York, 1907); H. M. Howe, *Metallurgy of Steel* (ib., 1908); Bradley Stoughton, *Metallurgy of Iron and Steel* (ib., 1908); Robert Forsyth, *Blast Furnace* (ib., 1908); Harboard and Hall, *Metallurgy of Steel* (4th ed., London, 1911); H. P. Tiemann, *Iron and Steel: A Pocket Encyclopedia* (New York, current); *Reports* and *Bulletins* of the Bureau of Statistics of the American Iron and Steel Institute (current); *Iron Age* (New York), especially its important annual numbers with their authoritative summaries; *Iron Trades Review* (Cleveland); *Stahl und Eisen* (Düsseldorf); *Bulletin American Institute of Mining Engineers*. See ANNEALING; IRON.

PRODUCTION AND CONSUMPTION OF PIG IRON IN THE WORLD.

From a Parliamentary Return drawn up by the British Board of Trade, published in 1914

YEARS	Total Average Production Tons Avoirdupois	Per head Cwts.	Total Average Consumption Tons Avoirdupois	Per head Cwts.
UNITED KINGDOM				
1894–98	8,239,000	4·2	7,355,000	3·7
1899–03	8,785,000	4·2	7,799,000	3·8
1904–08	9,531,000	4·4	8,292,000	3·8
1911	9,526,000	4·2	8,498,000	3·7
1912	8,751,000	3·8	7,706,000	3·4
1913	10,479,171	*	*	*
CANADA				
1904–08	483,000	1·5	579,000	1·8
1911	819,000	2·3	1,010,000	2·9
1912	906,000	2·5	1,181,000	3·2
UNITED STATES				
1894–98	9,230,000	2·6	9,138,000	2·6
1899–03	15,823,000	4·1	15,970,000	4·1
1904–08	21,300,000	5·0	21,490,000	5·0
1911	23,650,000	5·1	23,676,000	5·1
1912	29,727,000	6·2	29,578,000	6·6
GERMANY (including LUXEMBURG)				
1894–98	6,181,000	2·3	6,353,000	2·4
1899–03	8,479,000	3·0	8,614,000	3·0
1904–08	11,395,000	3·7	11,360,000	3·7
1911	15,324,000	4·7	14,634,000	4·4
1912	17,582,000	5·3	16,677,000	5·0
1913	19,291,920	*	*	*
RUSSIAN EMPIRE (excluding FINLAND)				
1894–98	1,649,000	0·3	1,758,000	0·3
1899–03	2,640,000	0·4	2,676,000	0·4
1904–08	2,745,000	0·4	2,734,000	0·4
1912	4,119,000	0·5	4,226,000	0·5

YEARS	Total Average Production Tons Avoirdupois	Per head Cwts.	Total Average Consumption Tons Avoirdupois	Per head Cwts.
FRANCE				
1894–98	2,247,000	1·2	2,213,000	1·1
1899–03	2,543,000	1·3	2,549,000	1·3
1904–08	3,217,000	1·6	3,170,000	1·4
1912	4,870,000	2·5	4,930,000	2·5
AUSTRIA-HUNGARY				
1894–98	1,210,000	0·6	1,331,000	0·6
1899–03	1,420,000	0·6	1,467,000	0·6
1904–08	1,647,000	0·7	1,704,000	0·7
1911	2,081,000	0·8	2,118,000	0·9
1912	1,732,000	*	*	*
BELGIUM				
1894–98	909,000	2·8	1,167,000	3·6
1899–03	1,002,000	3·0	1,269,000	3·8
1904–08	1,309,000	3·6	1,787,000	5·0
1911	2,018,000	5·3	2,684,000	7·1
1912	2,264,000	6·0	3,018,000	8·0
SWEDEN				
1894–98	490,000	2·0	451,000	1·8
1899–03	511,000	2·0	477,000	1·9
1904–08	562,000	2·1	516,000	1·9
1911	624,000	2·2	552,000	2·1
1912	689,000	2·5	577,000	2·1
SPAIN				
1894–98	131,000	0·1	104,000	0·1
1899–03	179,000	0·2	146,000	0·2
1904–08	331,000	0·3	301,000	0·3
1911	402,000	0·4	369,000	0·3
1912	*	*	*	*

* Figures not available.

IRON AND STEEL INSTITUTE, THE. An English association, organized by the iron trade of the north of England, the first meeting taking place in London, Feb. 25, 1869. Its object is the discussion of practical and scientific questions connected with the manufacture of iron and steel. There are two general meetings each year, one in May, in London, and the autumn one in other cities, not always in Great Britain, for the institute has met in Paris, Vienna, Brussels, and New York. Since 1874 it has annually presented the Bessemer gold medal, for some invention or notable paper, and it awards annually research scholarships founded by Andrew Carnegie, who gave $100,000 for this purpose. The Institute publishes the semiannual *Journal of Iron and Steel Industry*, containing original papers and abstracts and reviews from other publications.

IRONBARK TREE. A name given in Australia to certain species of *Eucalyptus* (q.v.), particularly *Eucalyptus siderophloia*, on account of the extreme hardness of the bark. These trees attain a height of 80 or 100 feet and a circumference near the base of 10 to 12 feet. The timber, which is very valuable for shipbuilding and other purposes in which hardness and durability are required, is rated as one of the strongest of Australian woods; its tensile strength exceeds that of hickory.

IRON CHANCELLOR, THE. A name given to Bismarck.

IRON CHEST, THE. A play by George Colman the Younger (1796), based upon Godwin's novel *Caleb Williams*.

IRON CITY, THE. Pittsburgh, Pa., so called from its iron and steel industries.

IRONCLAD. See SHIP, ARMORED.

IRON CROSS (Ger. *Eisernes Kreuz*). A Prussian military order or decoration first instituted in 1813 by Frederick William III as a reward for distinguished services in war. It consists of a Maltese cross, made of iron, edged with silver, and worn suspended from the neck or at the buttonhole. The superior decoration of the grand cross, a cross of double the size, is reserved for officers of high rank, who have successfully carried out a campaign, won a decisive battle, or conducted a brave defense of a fortress or position. The order was revived during the war with France in 1870–71, and in the Great European War of 1914– , when the Kaiser decorated great numbers of his soldiers. See Plate of ORDERS.

IRON CROWN. The name of the old crown of the Lombards, still preserved in the church of St. John the Baptist at Monza. It is made of six pieces and is adorned with 22 jewels, 26 golden roses, and 24 enamels. On the inside there is a circlet of iron, said to be formed from a nail used at the Crucifixion, brought from Palestine by the Empress Helena, given by Pope Gregory I to the Lombard Princess Theodelinda. Before the twelfth century it was called the golden crown. It was used at the coronation of the Lombard kings, and of the German emperors as kings of Italy. In 1805 Napoleon crowned himself at Milan with it. In 1838 it was worn by the Emperor Ferdinand I. In 1859 it was carried off by the Austrians, but after 1866 restored to Monza. Consult Bombelli, *Storia della corona ferrea* (Florence, 1870), and Thomas Hodgkin, *Italy and her Invaders*, vol. vi (Oxford, 1880).

IRON DUKE, THE. A popular sobriquet for the Duke of Wellington.

IRON GATES (Turk. *Demir-Kâpu*). A celebrated pass on the lower Danube, near Gladova, just below the point where the river leaves Hungary, where a spur of the Transylvanian Alps nearly barricades the river. It is the last great defile of the Danube and is about 2 miles in length. In 1890 the demolition of the obstructions to navigation was begun by a Hungarian company, and in the course of 10 years was practically completed. The work necessitated the excavation by blasting of nearly 1,200,000 cubic yards of rock, about half of which was in the river bed. The regulation work has afforded an artificial waterway for vessels, chiefly on the Servian side, through which there is an extremely rapid current.

IRON MASK, The Man in the (Fr. *L'Hommé au masque de fer*). The story of this mysterious prisoner confined at Pignerol, in the Bastille, and other French prisons in the reign of Louis XIV has long excited a romantic curiosity in the minds of students of history. The first notice of him in print was given in *Mémoires secrets pour servir à l'histoire de Perse* (Amsterdam, 1745–46), in which the prisoner was identified with the Duke of Vermandois, a natural son of Louis XIV and La Vallière, who had to expiate an offense against his half brother, the Dauphin Louis, with imprisonment for life. This absurd assertion was without foundation; for the Duke of Vermandois died in 1683, whereas the prisoner is known to have died in 1703; but the confidence with which it was made caused a deep sensation, and the romance of Mouhy, *L'Homme au masque de fer*, which immediately followed (Hague, 1746), was read with all the more avidity because it was prohibited by the court. Voltaire, in his *Siècle de Louis XIV* (1751), treated the anecdote historically, but without doing anything to unravel the mystery. The first authentic information with regard to the Man in the Iron Mask, therefore, was given by the Jesuit Griffet, who acted for nine years as confessor in the Bastille, in his *Traité des différentes sortes de preuves qui servent à établir la vérité dans l'histoire* (Liége, 1769). He quoted from the manuscript journal of Du Jonca, the royal lieutenant of the Bastille, according to which Saint-Mars, the Governor of the island of Sainte-Marguerite, in September, 1698, brought with him to the Bastille a prisoner whom he had already had in custody at Pignerol in Piedmont. The prisoner's face was always kept concealed by a mask of black velvet. The journal also mentions his death on Nov. 19, 1703, and that he was buried in the cemetery of Saint-Paul. This is confirmed by the register of burials for the parish of Saint-Paul, where the prisoner is mentioned under the name of Marchiel. These two entries are the bare facts of the case, and upon them have been erected theories and hypotheses without number. Besides the earliest story already mentioned, there have been at least four other explanations as to the identity of the prisoner. Among the minor conjectures are those which connect him with Fouquet, the financial minister of Louis XIV, and with the Duke of Monmouth, the illegitimate son of Charles II of England, to mention only a few of many. An addition to the article on the subject in the *Dictionnaire philosophique* freely states the opinion that the prisoner was a bastard brother of Louis XIV. The writer, who was probably the editor of the work, makes the prisoner an illegitimate son of Anne of Austria. Louis XIV first learned the existence of his brother when he came of age, and put him in confinement to guard against any possible unpleasant consequences. Linguet, in the *Bastille dévoilée*, ascribes his paternity to the Duke of Buckingham. Saint-Michel, in 1790, attempts to connect the prisoner with a supposedly secret marriage between Queen Anne and Cardinal Mazarin. What is remarkable is that the court continued to manifest an interest in the matter and took every means to keep the identity of the prisoner in the dark. When the Bastille fell, the prisoner's room was eagerly searched and also the prison register, but all inquiry was vain. The Abbé Soulave, who published *Mémoires du maréchal Richelieu* (London and Paris, 1790), tried to establish from a document alleged to have been written by the tutor of that unfortunate Prince that the Man in the Iron Mask was a twin brother of Louis XIV, and that, to avoid the calamities of a disputed succession to the throne, Louis XIII had caused the later born of the twins to be brought up in secret. Louis XIV learned of his brother's existence only after the death of Mazarin, and the twin brother, having discovered his relation to the King by means of a portrait, was subjected to perpetual imprisonment. This view of the matter was at one time almost universally prevalent. The first conjecture of what is still held by many to be the truth is contained in a letter dated 1770, written by a Baron d'Heiss to the *Journal Encyclopédique*. The same is repeated by Louis Dutens, who declares in his *Intercepted Correspondence* (1789) that there is no point of history better established than the fact that the prisoner in the iron mask was a minister of the Duke of Mantua. This minister, Count Matthioli, had pledged himself to Louis XIV to urge his master, the Duke, to deliver up to the French the fortress of Casale, which gave access to the whole of Lombardy. Though largely bribed to maintain the French interests, he began to betray them to several countries vitally interested; and Louis XIV, having obtained conclusive proofs of his treachery, contrived to have Matthioli lured to the French frontier, where he was kidnaped April 23, 1679, and conveyed to the fortress of Pignerol, which was his first prison. The conclusions of D'Heiss and Dutens were followed up by Roux-Fazillac, who published a small work on the subject in 1801. This attempt to show that Matthioli was the Man in the Iron Mask, though clever, was not altogether successful; but the documents later discovered and published by M. Delort and M. Marius Topin seemed to leave little doubt on the subject, and the public had apparently made up its mind that the secret was at last discovered, until a still more recent work by a French officer, M. Jung, seemed to show conclusively that Matthioli could not have been the mysterious prisoner, and endeavored to prove that the Man in the Iron Mask was a soldier of fortune of Lorraine, Marechiel by name, who was the head of a widespread and formidable conspiracy, working in secret for the assassination of Louis XIV and some of his ablest ministers. In the course of his researches M. Jung examined some 1700 volumes of dispatches and reports in the bureau of the Ministry of War. According to his story, Marechiel was arrested by order of Louvois in 1673, and after being brought to Paris was sent to Pignerol to be under the care of Saint-Mars, who took him with him to Exilles (1689), Sainte-Marguerite, and finally to the Bastille (1695), where the prisoner died in 1703. The so-called iron mask, really a velvet one, was burned with his clothes and effects. Lang in his work on the subject followed out this same idea, only his name for the prisoner was Dauger. Up to 1891 Jung's theory was considered satisfactory, but in that year Captain Bazières, of the garrison at Nantes, published a translation of some of Louis XIV's cipher dispatches to Louvois and the Minister's replies. From these it appeared that the mysterious prisoner was General de Bulonde, who was punished, for his mistake or cowardice in raising the siege of Cuneo, by lifelong imprisonment at Pignerol and later in the Bastille. During the last decade, however, there has been a reaction in favor of the Matthioli theory, due chiefly to the efforts of M. Funck-Brentano. Opinions still differ, and there is a tendency in many quarters towards regarding the Man in the Iron Mask as some obscure plotter, probably a valet possessed of a great secret, and therefore held in the strictest confinement. The whole question, however, is one of those mysteries of history that will probably never be satisfactorily solved, though it may be that the secret archives of the Vatican could throw light on the subject.

Bibliography. The literature concerning the Man in the Iron Mask is very large. Up to 1870, 52 works had been written to elucidate the mystery, and since then over 20 more have appeared. The following list, therefore, is merely a selection of the best and most noteworthy contributions to the subject: Roux-Fazillac, *Recherches historiques sur l'homme au masque de fer* (Paris, 1801); Delort, *Histoire du masque de fer* (ib., 1825); Topin, *L'Homme au masque de fer* (ib., 1870); Jung, *La vérité sur le masque de fer, 1664–1703* (ib., 1873); Loiseleur, *Trois énigmes historiques devant la critique moderne* (ib., 1882); Burgaud and Bazières, *Le masque de fer* (ib., 1883); Funck-Brentano, "L'Homme au masque de velours noir dit le masque de fer," in *Revue Historique*, vol. lvi (ib., 1894). The best work to consult in English is Hopkins, *The Man in the Iron Mask* (London, 1901); for the Dauger theory, consult Lang, *The Valet's Tragedy* (ib., 1903).

IRONMASTER, The. A dramatization of Ohnet's *Maître des forges*, by Pinero (1884).

IRON MOUNTAIN. One of the isolated knobs of the St. François Mountains, in St. François Co., Mo. It is 81 miles south of St. Louis, on the Iron Mountain Railroad, and is 1078 feet in elevation above the sea and 200 feet above the adjoining valley. This mountain contains deposits of specular hematite iron ore.

IRON MOUNTAIN. A city and the county seat of Dickinson Co., Mich., 72 miles northwest of Menominee, on the Chicago, Milwaukee, and St. Paul, the Wisconsin and Michigan, and the Chicago and Northwestern railroads, and on the Menominee River (Map: Michigan, B 3). It is noted for large iron-mining interests and contains a Carnegie library. Settled in 1879, Iron Mountain was incorporated in 1888. The government is administered by a mayor, elected annually, and a unicameral council. Pop., 1900, 9242; 1910, 9216.

IRON ORES. See Iron, *Iron Ore.*

IRON PYRITES. See Pyrites.

IRONS. The fetters used for confining prisoners. They consist of handcuffs, or *hand irons*, and *leg irons*, a pair of the latter being connected with light chains of sufficient length to permit the prisoner to walk, taking short steps. Irons are used to confine men for punishment, or for safekeeping when violent (as they frequently are when intoxicated), or when awaiting trial and it is feared they may attempt to escape. The Spanish used to confine their prisoners in *bilboes*, which consisted of shackles around the ankles joined by a bar of iron. In the seventeenth and eighteenth centuries bilboes were used to some extent in the British navy, and the name survived for a long time after the character of the irons had changed. The use of irons for confinement as a punishment has been abolished in the United States navy.

IRONSIDE, Sir. A knight of Arthur's Round Table.

IRONSIDES, Old. A name popularly used of the United States frigate *Constitution.* See Constitution, The.

IRONSMITH. A barbet. See Coppersmith.

IRONTON, ī′ẽrn-tŭn. A city and the county seat of Lawrence Co., Ohio, on the Ohio River, 134 miles southeast of Cincinnati, on the Norfolk and Western, the Cincinnati, Hamilton and Dayton, and the Detroit, Toledo, and Ironton railroads (Map: Ohio, E 8). The Chesapeake and Ohio Railroad, on the opposite side of the river, maintains a free passenger ferry and a large freight transfer. Ironton is the centre of a region rich in timber, iron ore, bituminous coal, and fire and pottery clay; carries on an important river commerce; and has extensive manufactories of iron (including foundries, machine shops, blast furnaces, rolling mills, wire-drawing and nail works, etc.), cement, lumber, machinery, boilers, stoves, furniture, doors and mantels, and fire brick. The city has a memorial hall, Masonic Temple, Odd Fellows' Hall, Briggs Public Library, fine Federal and Courthouse buildings, and Kingsbury School. The parks are Beechwood, River View, and Lincoln. Settled in 1832, Ironton was incorporated in 1849. The government, under the municipal code of 1902, is vested in a mayor, elected biennially, a unicameral council, and boards of public service and public safety. The city owns and operates its waterworks. Pop., 1900, 11,868; 1910, 13,147; 1914 (U. S. est.), 13,690.

IRONWOOD. A city in Gogebic Co., Mich., about 135 miles (direct) west of Marquette, on the Chicago and Northwestern and the Minneapolis, St. Paul, and Sault Ste. Marie railroads, and on the Montreal River (Map: Michigan, F 2). Iron mining is the principal industry, though lumbering is of considerable importance. Among the more prominent buildings are a fine city hall, the Luther L. Wright High School, and the Carnegie Library. Settled in 1884 and incorporated in 1887, Ironwood is governed under the revised charter of 1893, which provides for a unicameral council and for a mayor, elected annually and controlling, subject to the consent of the council, the appointments of all subordinate officials excepting the school trustees, city clerk, and city treasurer. Pop., 1900, 9705; 1910, 12,821; 1914 (U. S. est.), 14,147.

IRONWOOD. A name given to various trees with hard, heavy wood. *Metrosideros vera*, a native of Java and other Eastern islands, is much valued by the Chinese and Japanese for making rudders, etc., and is exported in small quantities. The bark is used in Japan as a remedy for diarrhœa and mucous discharges. *Mesua ferrea*, a native of the East

Indies, is planted for its heavy hard wood and for its fragrance and roselike flowers. In Australia the name ironwood is given the timber of *Melaleuca genistifolia*, *Myrtus gonoclada*, *Notelæa ligustrina*, and *Olea paniculata*. In the United States it is applied to *Ostrya virginiana*, *Carpinus caroliniana* (see HORNBEAM), *Eugenia garberi*, and other trees which have tough wood. *Olea laurifolia* and *Sideroxylon inerme*, called ironwood in the south of Africa, are valuable timber trees. The name ironwood is given to *Casuarina equisetifolia* in Australia; to *Parrotia persica* in Persia; to *Mimusops djava* in tropical Africa; to *Ixora ferra* in the West Indies; and to various species of *Citharexylum* in tropical America. See CASUARINA.

IRONY, ī′rô-nĭ (Lat. *ironia*, from Gk. *εἰρωνεία*, *eirōneia*, dissimulation, irony, from *εἴρων*, *eirōn*, dissembler, from *εἴρειν*, *eirein*, to talk). The name given to that peculiar style of thought and expression by which words are gravely made to convey literally a meaning quite other than that actually intended. When skillfully used, there is no more fatal literary weapon of destruction. Such an instrument it was in the hands of Swift, when, e.g., he proposed to the poor people of Ireland, apparently in all seriousness, that they should rid themselves of poverty by selling their children to the rich, who should eat them. Irony united with a kindlier feeling is one of the charms of Thackeray's style. There is also the irony of fate, or of events, where the issue is otherwise than might with reason or justice be expected. See RHETORIC, FIGURES OF.

IROQUOIAN (ĭr′ô-kwoi′an) **STOCK.** One of the most important linguistic stocks of the American Indians, formerly inhabiting a large part of the present Ontario, New York, Ohio, and Pennsylvania, with portions of eastern Virginia and North Carolina and the whole of the southern Alleghany region. The stock name is derived from that of the Iroquois (q.v.), or confederated Five Nations of New York—the Mohawk, Oneida, Onondaga, Cayuga, and Seneca. Other important tribes were the Wyandot (or Huron), Neutral Nation, Erie, Conestoga, Nottoway, Meherrin, Tuscarora, and Cherokee. See IROQUOIS; CHEROKEE; WYANDOT.

IROQUOIS, ĭr′ô-kwoi′. A confederacy of five tribes of Iroquoian stock—Mohawk, Oneida, Onondaga, Cayuga, and Seneca—to which the Tuscarora were afterward added. They called themselves by names signifying respectively "we of the long house" and "real people." The term *Iroquois* is of French origin, being possibly compounded from two ceremonial words of frequent occurrence in their councils, with the addition of the French suffix *ois*. Another theory makes it an Algonquian derivative. Their Algonquian neighbors knew them as *Mengwe* or *Nadowa*, about equivalent to "alien" or "enemy," while by the English they were designated as the Five, or Six, Nations.

The people found by Cartier in 1535 occupying the shores of the St. Lawrence River from the present Quebec to Montreal were of Iroquoian stock, as proved by linguistic evidence, and appear to have been, in part at least, the ancestors of the later Iroquois. These tribes were dispossessed shortly afterward by the more powerful Algonquian tribes, some, like the Hurons, taking refuge farther to the west, while others, including the Iroquois, retired to the south. Shortly after this withdrawal—probably about the middle of the sixteenth century—the tribes known later as the Five Nations were persuaded by the counsel of their traditional legislator, Hiawatha, to form a league or confederacy upon such a well-ordered plan that it has endured for more than three centuries and exists to-day as their ruling government, in spite of all the changes brought about by the advent of the white man. The five tribes at this time occupied central and western New York, where they were found in 1609 by Champlain, who, by joining forces with their Algonquian enemies, brought down upon the French the lasting vengeance of the Iroquois League, which was one of the main factors in the ultimate loss of Canada.

By the formation of the league, in which each tribe represented a state government, with a central federal council of 50 chiefs sitting at Onondaga, the Iroquois were enabled to withstand the inroads of the hostile Algonquian tribes, and even to assume the offensive. On the establishment of the French missions among the Hurons (see WYANDOT), about the year 1630, the Iroquois, who in the meantime had been supplied with firearms by the Dutch on the Hudson, began war upon their kinsmen in Canada with such effect that in a few years those of the Hurons who had not been slaughtered or carried into captivity were forced to abandon their country and fly hundreds of miles to the west. The same fate soon after befell the cognate Neutral Nation and the Erie, as well as the Ottawa and others of Algonquian race, resulting in almost complete ruin to the French missions in Canada. The destroyers then turned upon the Conestoga and others in the south, the Mohican and others east of the Hudson, and the Miami and Illinois in the west, until by the year 1700 they claimed and were conceded a paramount influence and dictation from Hudson Bay to the Cherokee frontier of Carolina, and from the Connecticut almost or quite to the Mississippi, the only tribes able to make successful opposition being the Ojibwa in the northwest and the Cherokee in the south. From the beginning of the Colonial period they held the balance of power between France and England in the north, and were courted alike by both, but remained steadfast to the English interest. The few exceptions were chiefly in the case of the Mohawk and Cayuga, who yielded to the influence of the French Jesuit missionaries, by whom they were finally drawn off from the territory of the league and settled in the mission villages of Caughnawaga and St. Regis. About the year 1715 the cognate Tuscarora, who had been driven out from North Carolina in a war with the settlers, removed to New York, where they were assigned lands by the Iroquois and admitted as the sixth nation of the league.

At the outbreak of the Revolution in 1775 the league council declared for neutrality, while allowing each of the six component tribes to take sides as it thought fit. The great majority of the Iroquois sided against the Americans, only the Oneida and a part of the Tuscarora refusing. The Mohawk and Cayuga followed their great chief, Brant, in a body to Canada. At the close of the struggle these, with other Iroquois who had supported the English cause, were settled by the Canadian government on a reservation on Grand River, Ontario, where most of them still remain, others being at Quinte Bay, Thames River, and Gibson, in the same province.

The Catholic Iroquois are at Caughnawaga, St. Regis, and Lake of Two Mountains, in Quebec Province, but are no longer affiliated with the league. Those of Caughnawaga constitute the largest single Indian settlement north of Mexico. In addition to the Catholic St. Regis Iroquois in Canada, about as many more are on the New York side of the line, the reservation having been cut in two when the boundary was finally established by survey. The Iroquois in the United States are all on reservations in New York, excepting the Oneida, most of whom removed to Wisconsin about 1820, and a mixed band of so-called Seneca in Oklahoma.

The political importance of the Iroquois, although due in part to their geographic situation and early acquirement of firearms, was in great measure the result of their superior system of organization and of their individual force of character. The same traits have enabled them to hold their own in the midst of an alien surrounding. Prominent features of their system were the council of matrons, the elaborate clan structure, and the wholesale adoption of captives, who, if spared, were admitted to full tribal rights, instead of being reduced to semislavery, as among some other tribes. The best single source of information upon the confederacy is probably L. H. Morgan, *League of the Hodé-no-sau-nee or Iroquois* (Rochester, 1851; new ed., New York, 1904). Dialectically all the Iroquoian tribes closely resemble each other.

The Iroquois had a highly developed woodland culture (see INDIANS), being noted for their fields of corn, pumpkins, tobacco, to which they later added orchards of apple and peach. They built long bark-covered houses, the various families of a clan residing in compartments along the sides. This was the famous "long house," the symbol of the league, or government. They made fine black pottery, splint baskets, and fine mats of corn husk. The wampum belt was used by them for public records. They maintained many secret societies, known in literature as "false-face societies," because the members wore curious carved wooden masks representing various deities. Consult: C. Colden, *History of the Five Indian Nations of Canada which are Dependent on Province of New York* (2 vols., New York, 1904); W. M. Beauchamp, *Civil, Religious, and Mourning Councils and Ceremonies of Adoption of New York Indians* (Albany, 1907); H. C. Converse, *Myths and Legends of New York State Iroquois* (ib., 1908). The New York State Museum has large collections representing the aboriginal life of the Iroquois and has published many important monographs on them in which may be found detailed information.

The present number of the Iroquois, including those of the Catholic mission colonies which have cast off all allegiance to the ancient league, is considerably above 17,000, distributed as follows: Ontario, Canada, Iroquois and Algonquins of Gibson, 139 (perhaps one-half being Iroquois); Mohawks of the Bay of Quinte, 1271; Oneidas of the Thames, 770; Six Nations on the Grand River, 4195. Quebec, Canada, Iroquois of Caughnawaga, 2074; Iroquois of St. Regis, 1426; Iroquois and Algonquins of Lake of Two Mountains, 393 (perhaps one-half being Iroquois). In the United States—New York reservations, 4918; Wisconsin (Oneida), 2107; Oklahoma (Seneca), 215. See IROQUOIAN STOCK.

IROQUOIS, or MATILDA. A port of entry of Dundas Co., Ontario, Canada, 43 miles southeast of Ottawa, on the left bank of the St. Lawrence and on the Grand Trunk Railway (Map: Ontario, J 4). It commands the entrance to the Iroquois Canal. Pop., 1901, 1097; 1911, 849.

IRRA'DIA'TION. In optics, the apparent enlargement of a white or strongly illuminated object when seen against a dark ground. Helmholtz attributes the phenomenon to want of perfect accommodation in the eye, whereby diffusion images are formed about the true image of the bright object and, encroaching upon the surrounding dark region, extend the borders of the image. See VISION.

IRRA'TIONAL NUMBER. Any number that cannot be expressed as the quotient of two integers. A fraction or quotient of two integers may be expressed in the form of either a terminating or a nonterminating decimal, the latter always containing a repetend. (See DECIMAL SYSTEM.) Thus, $\frac{8}{5}$ equals 1.6, a terminating decimal; $\frac{2}{3}$ equals 0.6666 . . . ., a nonterminating decimal. In either case the decimal may be transformed again into the common fractional form by the formulas of series (q.v.). But when the process of evolution is applied to integers and the results are expressed decimally, there is often produced a decimal form that is nonterminating, contains no repetend, and cannot be expressed as the quotient of two integers. For example, the surd $\sqrt{2}$ equals a number (1.4142 . . . .) containing a nonterminating and nonrepeating decimal, and cannot be expressed as the quotient of two integers. While, however, evolution thus often results in an irrational number, it is not every irrational number that can be expressed in the form of a surd. This may be plainly seen in the case of π, the ratio of the circumference to the diameter of a circle. The value of this irrational number to five decimal places is 3.14159 . . . . See CIRCLE.

Certain operations with irrational numbers were performed by the ancients. The Pythagoreans proved the irrationality of the square roots of 3, 5, 7, ... 17. The arithmetic part of Euclid's *Elements* contains a geometric treatment of the subject. Archimedes approximated the value of a great number of surds, stating, e.g., that $1351/780 > \sqrt{3} > 265/153$; but the method by which he arrived at his results is unknown. In the Middle Ages Fibonacci, and still later Stifel and Rudolff, devoted much attention to irrationals. But not until very recent times has a purely arithmetic theory of surds been produced, through the researches of Weierstrass, Dedekind, G. Cantor, and Heine, whose efforts were inspired by a desire to fortify the bases of analytic mathematics. No adequate explanation of these methods can be given here. That of Weierstrass starts with a consideration of the formation of different kinds of number through arithmetical operations. Dedekind arranges positive and negative, integral and fractional numbers in order of magnitude, and observes that any rational number, as a, divides the system into two classes, C_1 and C_2, such that every number in C_1 is less than every number in C_2, and a is either the greatest number in C_1 or the least in C_2. These rational numbers are then represented by points on a straight line. But there are still an infinite number of points on the line for which there are no corresponding rational numbers. He then shows that to every one of these points corresponds a unique irrational number. Cantor and Heine introduce irrational number through the concept of a fundamental series. Following is an example of the series method. The surd $\sqrt{2}$ lying between 1.4142 and 1.4143 may be expressed thus:

$$\frac{14}{10}+\frac{1}{100}+\frac{4}{1000}+\frac{2}{10000}<\sqrt{2}<\frac{14}{10}+\frac{1}{100}+\frac{4}{1000}+\frac{3}{10000},$$

or, more generally,

$$\frac{N_1}{10}+\frac{N_2}{10^2}+\frac{N_3}{10^3}+\cdots\frac{N_p}{10^p}<\sqrt{2}<\frac{N_1}{10}+\frac{N_2}{10^2}+\frac{N_3}{10^3}+\cdots\frac{N_{p+1}}{10^p}.$$

Now, as p becomes indefinitely great, $\sqrt{2}$ evidently becomes the common limit of the two series, and may therefore be defined by them. Expressing the sum of the series on the left by P/Q, and that on the right by $(P+1)/Q$, the square root of 2 may be expressed by the relation $P/Q<\sqrt{2}<(P+1)/Q$. Similarly, any irrational number I may be expressed by the relation $P/Q<I<(P+1)/Q$, where P and Q are derived from the corresponding series.

Bibliography. Consult: Dedekind, *Essays on Number*, translated by Beman (Chicago, 1901); Dirichlet, *Vorlesungen über Zahlentheorie* (Brunswick, 1879); Stolz, *Vorlesungen über allgemeine Arithmetik* (2 vols., Leipzig, 1885–86).

IRRAWADDY, ĭr′ȧ-wä′dĭ, or **IRAWADI.** The principal river of Burma (Map: Burma, C 3). It rises on the extreme northeast border, near Mount Daphabum, a peak of the Namkiu Mountains, and flows southward with a tortuous course over 1500 miles, till it enters the Bay of Bengal through a large delta between the cities of Rangoon and Bassein. The scenery along its banks is extremely varied; the lower valley, especially the delta, is occupied by wide and level rice fields; farther up there are undulating, fertile, and thickly populated agricultural districts, broken here and there by large forests, and in three places the river breaks through mountain ranges in narrow and rocky defiles. The third or uppermost of these, which is 140 miles above Bhamo and 1168 miles from the sea, is the head of navigation for boats and small steamers. Below this the river is wide and deep, and the current not too swift, even for sailboats. Steamers ply regularly to Bhamo, and the river is an important artery of commerce for the interior of Burma, though it has now been supplemented by a railroad running parallel with its valley from Rangoon to Bhamo, crossing the river at Mandalay. For 100 miles from the sea extensive embankments have been built to protect the low delta plain from inundations. The river rises in March and reaches its maximum height in September. During November and December it is at its lowest stage and considerably blocked by sand deposits. For a description of the river and the country on its banks, consult Mowbray, "A Sail Down on the Irrawaddy," in the *Scottish Geographical Magazine*, vol. xvii (Edinburgh, 1901).

IR′REDEN′TISM (from *irredentist*, It. *irredentista*, from *Italia irredenta* (unredeemed Italy), *irredenta* being from Lat. *in-*, not + *redemptus*, p.p. of *redimere*, to redeem, from *red-*, back again + *emere*, to buy, take). A popular movement which originated in Italy after 1878, having for its object the recovery of what its adherents call "unredeemed Italy," *Italia irredenta*, meaning all that territory at present belonging to Austria, Switzerland, France, or England having an Italian-speaking population, but no longer forming part of Italy. Under this description would come southern Tirol, Triest, Görz, Istria, and Dalmatia, the Swiss Canton of Ticino, Corsica, Nice, and Malta. To all but the most exalted patriots the chimerical nature of the Irredentist programme is apparent, inasmuch as its execution would involve the surrender by Switzerland of territory it has held for more than 300 years, by Austria of its only seaport, Triest, and by England of its great base in the central Mediterranean, Malta. Besides, Italian is not the universal language in Tirol, Görz, or Istria. Malta has a dialect of its own, and Dalmatia is completely Slavic. Irredentism has ceased to be an influential factor save with the younger element in Italian politics. Whatever force Irredentism has is directed against Austria in order to recover Triest, but the movement received a severe setback in the formation of the Triple Alliance embracing Austria. Irredentism was revived by the Great European War which began in 1914. The failure of Italy to aid Germany and Austria was hailed with great jubilation, and the government was forced to call out the troops to quell anti-Austrian demonstrations. See POLITICAL PARTIES, *Italy*.

IR′REDU′CIBLE CASE. See CUBIC EQUATION.

IRREF′RAGABLE DOCTOR. See ALEXANDER OF HALES.

IRREG′ULARITY. In plants, a term used in connection with the descriptions of flowers. Flowers are regular in which all the members in each set are alike, and, conversely, irregularity means that all the members in a given set are not alike. In practice, regularity and irregularity have to do chiefly with the petals. There are many kinds of irregularity, but the three principal types are characteristic of the three great divisions of angiosperms. Among the Archichlamydeæ the Leguminosæ represent the most important region of irregularity, which is of the papilionaceous (butterfly) type, as in sweet pea. Among the Sympetalæ the characteristic irregularity is the bilabiate (two-lipped) type, as in the mints. Among the monocotyledons the chief region of irregularity is in the orchids, in which one of the petals usually develops a more or less elongated spur and a projecting lip.

IRREG′ULARS (ML. *irregularis*, not according to rule, from Lat. *in-*, not + *regularis*, relating to rule, from *regula*, rule, from *regere*, to rule). A military term generally applied to partisan and to guerrilla troops assisting the regular establishment. They are, as a rule, only partially trained and equipped, as, e.g., the Francs-tireurs (q.v.) in 1871; some of the Cossack (see COSSACKS) regiments of Russia; the Bashi-Bazouks (q.v.) of Turkey; and the armies of the feudatory chiefs and rulers of India. See ARMIES; GUERRILLAS.

IR′RIGA′TION (Lat. *irrigatio*, from *irrigare*, to irrigate, from *in*, in + *rigare*, to moisten; connected with Goth. *rign*, AS. *regn*, OHG. *regan*, Ger. *Regen*, Eng. *rain*, and probably with Gk. *βρέχειν*, *brechein*, to wet). In agriculture, the process of increasing the growth of crops by an artificial application of water.

The practice of irrigation is very ancient. There is evidence to show that works for the storage and distribution of irrigation water were constructed in Egypt as early as 2000 B.C. Extensive works, intended for irrigation on a large scale, existed in times of remote antiquity also in Assyria, Mesopotamia, Persia, India, Ceylon, China, and other parts of the East, as well as in Peru, Mexico, and the southwestern United States (New Mexico and Arizona) in the Western Hemisphere. In all these regions irrigation is necessary for successful agriculture, because the rainfall is insufficient for the needs of ordinary crops. Irrigation is also required even in humid regions for crops, such as rice and cranberries, which require a large amount of water, and is of advantage in growing truck and fruit crops, which are susceptible to injury by short droughts.

The area of the earth's surface over which the annual rainfall is deficient (less than 20 inches or 500 millimeters), and irrigation consequently generally practiced, is very extensive. In addition to this vast area in which irrigation is common, there are considerable areas in the so-called humid regions in which the irregularity of the rainfall makes irrigation profitable. The extent to which the arid lands can be reclaimed depends upon the water supply available for irrigation. It has been estimated that there is sufficient water to irrigate only about one-tenth of the arid region of the United States, or from 75,000,000 to 100,000,000 acres. Of this irrigable area probably not more than 15,000,000 acres have already been reclaimed. In Europe irrigation prevails chiefly in the south, where it was introduced by the Romans. It is most extensively and systematically practiced in Lombardy and Piedmont, in Italy, in Spain, and the south of France, but exists to some extent in other parts of Europe. Wilson estimates the irrigated area in Italy to be about 4,700,000 acres, in Spain 2,800,000 acres, in France 400,000 acres. Nowhere else is irrigation practiced on so large a scale as in India, and the irrigation systems of that country are being rapidly extended by the British government. According to a commission appointed by the British government, the irrigated area in India is about 40,000,000 acres. Considerable areas in Turkestan have been irrigated for many years, and the Russian government is now undertaking large extensions. The Turkish government is building works to irrigate the valleys of the Tigris and Euphrates and restore them to their ancient prosperity. China has large irrigated areas, and the Chinese government in 1914 appointed a commission of foreign engineers to study its irrigation conditions and recommend policies for the future. Egypt has an irrigated area of about 6,000,000 acres, although irrigation works now in process of construction will increase this area to some extent, and plans for further extension on the Blue Nile and the White Nile are being prepared. Only at a comparatively recent date has irrigation been introduced into Australia, but it is rapidly extending there. The same is true in a measure of South Africa and South America. The practice of irrigation has declined or entirely disappeared in many of those regions where it prevailed most extensively in remote antiquity, but the ancient works are being restored and new ones built in Mesopotamia. See INDIA.

Water Supply for Irrigation. Water for irrigation is derived from (1) natural streams, springs and lakes; (2) wells; (3) storage of storm waters. In some places, particularly in Europe, the sewage water of cities is used for irrigating purposes. The United States Census of 1910 showed that in that country 94 per cent of the land irrigated was supplied with water from streams. It is probable that fully as large a percentage of the land irrigated throughout the world is supplied from the same source.

In torrential streams with sandy bottoms, diversion dams are usually made of brush, rocks, and sand, and are expected to be washed out in almost every flood and to be replaced when the flood has passed. In streams where better foundations can be secured more permanent dams of wood, masonry, or concrete are built. (See DAMS and RESERVOIRS.) These are for the purpose of holding back the water and directing it into the canals which are to convey it to the place of use.

At the heads of most canals there are more or less elaborate works for shutting out the water which is not needed or belongs to others. In new countries these sometimes consist of mere piles of rock which are increased or diminished as it is desired to get more or less water into the canals, but usually there are structures with openings for the passage of water, which are controlled by gates which can be opened to admit water to the canals and closed to shut it out. In the early days of irrigation in the United States most of these structures were of wood with vertical wooden gates which slid in grooves. As these decay or are destroyed they are being replaced by concrete and steel structures, and most of the newer works are of this type. In other countries masonry and concrete are more generally used than in the United States.

Most canals are excavated in the natural earth and are unlined, but in rough and rolling country water is carried through hills in tunnels, along steep hillsides and across valleys in timber, metal, and concrete flumes, and through deep valleys in pipes which go down one side and up the other, commonly called inverted siphons. Much water is lost from canals by seepage into the sides and bottoms, and many canals are lined with a thin coating of cement plaster to prevent losses by seepage.

Water is turned from the main canals to branch canals which carry it to the land to be irrigated, to which it is delivered by still smaller branches. The structures and gates for controlling the flow of water into the branch canals are much like those at the heads of the main canals, except that they are on a smaller scale.

With few exceptions streams which are used for irrigation are subject to annual floods which are followed by long periods of low water. It is therefore necessary, if all the water is to be utilized, to store the surplus water during flood periods for use during the low-water periods. This requires the building of reservoirs (see DAMS AND RESERVOIRS) in which to store the surplus waters. These are sometimes formed in the channels of streams by building dams in the places where large basins will be filled by the water held back, and are sometimes in natural depressions outside the stream channels filled through feed canals from the streams. The Census of 1910 showed nearly 7000 reservoirs in the United States with an aggregate capacity of 12,600,000 acre feet. Among the famous reservoirs in the world are the one formed in the valley of the Nile by the building of the Assuan Dam, the Roosevelt Reservoir in the Salt River in Arizona, and the Pathfinder Reservoir in the North Platte River in Wyoming. Much water is stored by raising the outlets of lakes on the headwaters of rivers. This water is retained when not needed for irrigation and turned into streams when they are low.

In many countries small reservoirs, away from stream channels, are built to store storm waters. This practice is very common in India, where a considerable part of the land irrigated is supplied from such reservoirs, commonly called tanks. About 100,000 acres were watered from such reservoirs in the United States in 1910.

In the United States wells rank next to streams as a source of water supply for irrigation, serving about 350,000 acres in 1910. About one-third of the acreage was supplied by flowing wells and two-thirds by pumped wells. The larger part of this acreage lies in California and New Mexico. Since flowing wells occur only under peculiar geological conditions, it is not probable that they will ever be a very important source of water for irrigation. Ground water which can be pumped is, however, of very general occurrence and will be increasingly important as the supply which can be cheaply diverted from streams is exhausted. Springs are an unimportant source of supply, as they are not of very general occurrence and the flow is usually small.

In addition to the water pumped from wells, much is pumped from streams. This is particularly true of the rice-growing districts of Louisiana and Texas in the United States. Practically all of the water used for rice irrigation in the States named and in Arkansas is pumped, and along the Gulf coast most of it is pumped from the rivers and bayous which drain that section. In the rice districts most of the pumping is done with large steam plants burning crude oil, which operate large centrifugal and rotary pumps. In other sections, where individual farmers have their own pumping plants, gasoline engines are in very general use. In California electrical power, generated by water power, is much used for irrigation. Both centrifugal and deep-well pumps are used with the gasoline engines and electric motors. In Egypt many of the canals which carry water from the Nile are below the land to be irrigated, and the water is lifted from the canals to the lands by crude devices which have been in use for centuries, and also by the most modern motors and pumps.

Except where natural drainage is measurably good, long-continued irrigation has a tendency to raise the ground-water level to such an extent as to injure the land, and drainage becomes necessary. This is now being provided in many cases when the irrigation system is constructed. See Drainage.

Types of Conduits. Main canals and conduits are often the most expensive part of irrigation works, owing to their length and the difficulties encountered in their construction. The cheapest and simplest conduit is a ditch, heading in the source of supply and departing just sufficiently from the natural contour of the country to insure a flow of water. In the early days of irrigation such ditches were little more than single furrows, or channels no larger than might be formed by a plow, leading a short distance from the banks of a stream. To-day there are thousands of miles of irrigation ditches or canals large enough for small boats, while in India and Italy it is quite common to build combined irrigation and navigation canals, thus affording a ready outlet for the products of the irrigated area and inlets for supplies. In rolling or hilly country canals may have to follow circuitous routes to maintain their level, thus adding greatly to their length. It may be cheaper or, when a stream or valley is encountered, even necessary to continue the line of the canal, changing the construction to an elevated flume or else substituting a pipe or inverted siphon, laid on or in the ground.

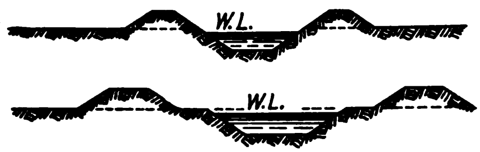

FIG. 1. EARTH CANAL UNLINED.

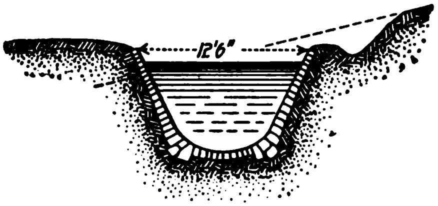

FIG. 2. CANAL IN EARTH LINED WITH MASONRY.

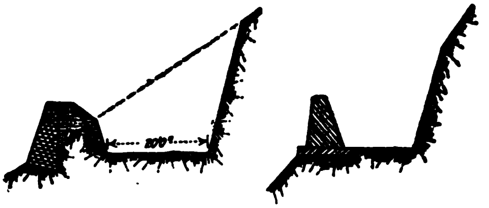

FIG. 3. CANALS ON ROCK SLOPE WITH RETAINING WALLS.

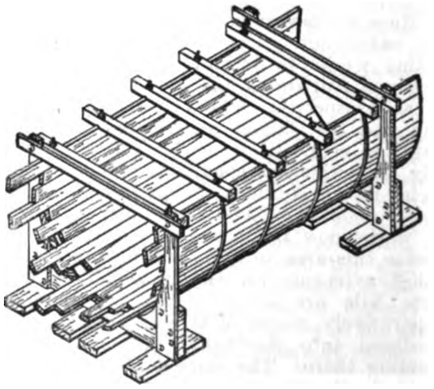
FIG. 4. SEMICYLINDRICAL WOOD-STAVE FLUME.

Seepage should be guarded against. To this end lining with stone laid in mortar or with concrete or with cement mortar may be employed. A great advantage in linings, if reasonably smooth, is that they increase the carrying capacity of the canals by lessening the friction, and aid in maintaining it by lessening the sedimentary deposits and plant growths on their sides and bottoms. Sometimes leakage may be diminished by throwing powdered clay into the water at the head of the canal. The sedimentary matter naturally carried by the water will often reduce the leakage in a few months or years.

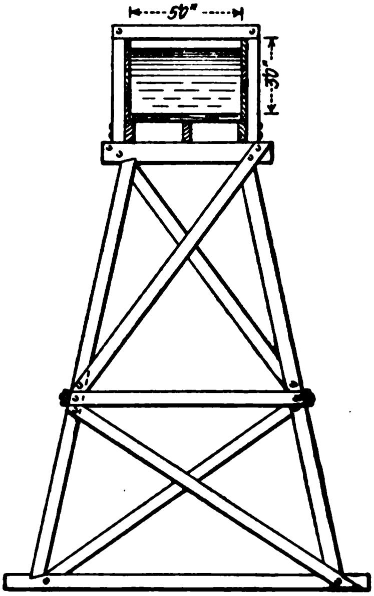

FIG. 5. WOOD IRRIGATION FLUME ON TRESTLE.

Flumes are most commonly built of wood, with a rectangular cross section, but in recent years steel has been employed, particularly in steep rocky locations or where the flume crosses streams or deep ravines. The ordinary flumes of boards or plank are subject to leakage. To avoid this, and also to give a channel better adapted to the flow of water, wooden staves are sometimes being employed, formed into a semicircular or other shape designed to give a curved bottom. The staves are held in place by steel rods or bands, so arranged that they can be tightened by turning nuts. The steel flumes are made of thin plates riveted together. Galvanized iron flumes are also quite common in the United States. Flumes may rest on mudsills or timbers placed on the ground, but, being generally designed to cross depressions, they are more frequently supported on trestles. The trestles, like the flumes, are generally of wood, but they are sometimes of steel, particularly where the flume proper is of that material or where the flume support must be in spans, as at a stream crossing. In the most recently built projects in the United States and in many older projects in other countries masonry and concrete flumes are quite common.

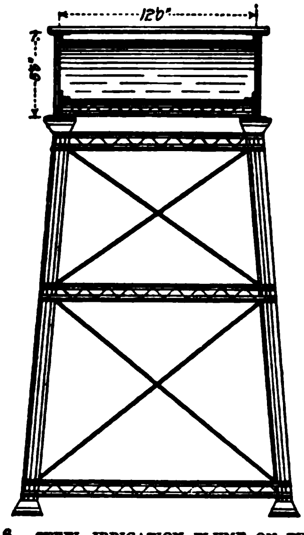

FIG. 6. STEEL IRRIGATION FLUME ON TRESTLE.

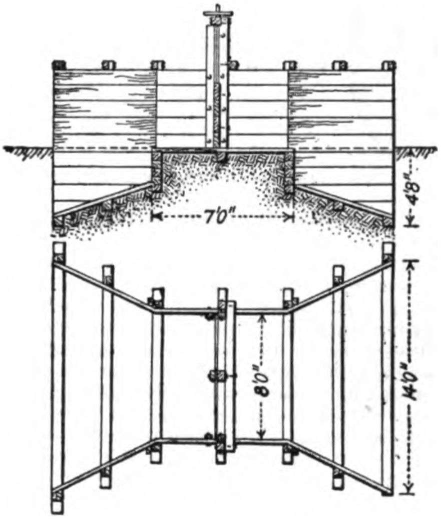

FIG. 7. HEAD GATE FOR SMALL IRRIGATION CANAL.

When, instead of valleys or streams, hills are encountered, necessitating long detours for canals, tunnels are often employed. They do not differ materially from other tunnels. If lining is necessary, as in earth, or to reduce the friction when in rock, it may be of brick, concrete, or stone, and resembles that for masonry aqueducts in tunnels. See TUNNEL; AQUEDUCT.

Headworks of some kind are required for nearly all canals, flumes, or pipe lines. In America they are generally of timber or concrete, but in much of the foreign work they are more commonly permanent structures of stone. The essential features are a bulkhead, gates, and wasteway. Where there is a dam at the head of the canal, the headworks may be at one end of it or form a part of it.

Pipes may be substituted for canals or flumes, either to convey water across depressions or under streams, as already mentioned, or to prevent losses from both evaporation and seepage. Either riveted steel or wood staves are the materials most commonly used for such pipes, being preferable to cast iron on account of their relative lightness and consequent ease of transportation in rough country remote from railways. Where the water is under little or no pressure, either vitrified clay or cement pipes are sometimes used, particularly in southern California, and reënforced concrete pipes are used where the pressure is greater.

Works for Final Distribution consist chiefly of open or closed channels, generally the former, leading from the main or branch canal or other conduit to the land to be irrigated. For the most part small ditches are employed, with permanent or movable gates, or temporary earth dams, to divert the water to or from the minor channels.

Except as modified by the topography, the application of water to land is chiefly a detail of agriculture rather than engineering, depending on the crop and the soil and also the ideas of the cultivator. Subsurface irrigation is generally considered impracticable because of the difficulties experienced in securing a thorough spreading of the water, besides which the pipes may clog and the construction prove expensive. Surface application, therefore, is almost universally employed. Broadly speaking, the latter is effected either by flooding the whole surface or sending the water through furrows. Neither involves much engineering skill, but it is best to have the main channels located with the aid of a level, particularly where the areas are large or have an irregular surface. Where pipe systems are employed for final distribution, thin wrought iron or steel, vitrified pipe, or plain and reënforced concrete may be used, and hydrants must be provided for drawing out the water.

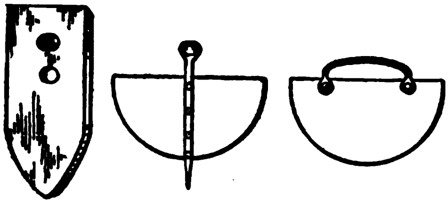

FIG. 8. TAPPOONS (WOOD AND METAL) FOR USE IN IRRIGATION.

The distribution of water by means of underground pipes, standpipes, and hose is, however, too expensive for irrigation on a large scale. The open ditch, which takes the water out of the larger canal or reservoir to the land to be irrigated, is made to follow the contour of the land, so that the flow is moderate and uniform and the water can be readily distributed to lateral ditches or flumes at any desired point. The simplest method of turning water from a ditch is to cut a hole in the side and to use earth to make a dam in the ditch. An improvement on this method is the use of portable cloth, wood, or metal dams or tappoons. The water is spread over the land by a variety of methods, which belong, as a rule, in three main classes: (1) flooding, (2) furrow irrigation, and (3) subirrigation.

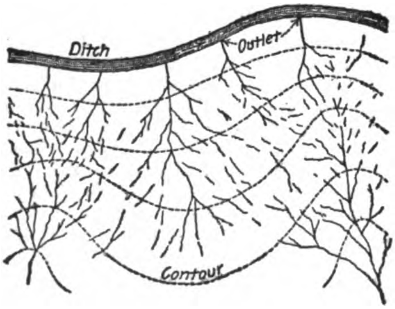

FIG. 9. IRRIGATION BY FLOODING.

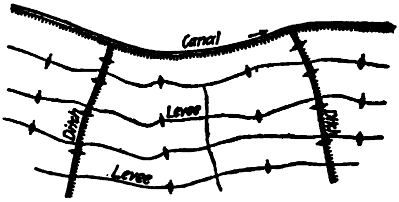

FIG. 10. CHECKWORK IRRIGATION.

Wickson describes the following methods practiced in the western United States: 1. Free flooding or running water on the land without restraint, except that of the banks of the lateral conveying it. In this method the ditches or laterals are carried along the higher parts of the field and the water is released by spade cuts at intervals in the banks, or it is made to overflow the banks by means of dams, as described above. This is the oldest and simplest method of irrigation. It is best suited to small grains and forage plants which are sown broadcast, and is most effective with nearly level ditches and on land of uniform grade. On account of the labor involved and the difficulty of securing uniform irrigation, this method has been superseded in many places by one of the check systems. 2. Flooding in contour checks or irregular areas of land inclosed by low embankments, the size and shape of these areas being determined by the inequalities of the surface. This method is best adapted to land of very gentle slope. Its first cost is considerable, but it permits more effective irrigation with less labor than free flooding. In

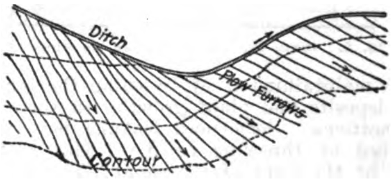

FIG. 11. FURROW IRRIGATION.

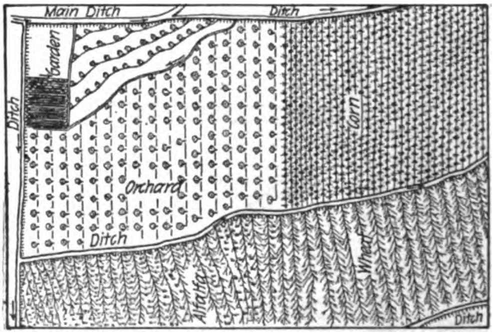

FIG. 12. PLAN OF IRRIGATED FARM.

this method the highest check is filled from the ditch or lateral, and the water is either allowed to overflow into the next lower check or is drawn off into it by means of gates provided for the purpose. 3. Flooding in rectangular checks or level areas of approximately the same size inclosed by low embankments. This method is little used except for orchard, vineyard, garden, and rice irrigation, being largely superseded for other purposes by the contour check method. Unless the land is quite level, its preparation for the method involves the shifting of a large amount of earth, and the levees of irregular heights which are required interfere with the use of power machinery in cultivating. 4. Flooding by the border method, in which fields are divided into long strips by low parallel embankments between which water is made to flow over the fields. 5. Depressed bed method, in which the ditches are carried on the tops of the levees and the water is allowed to soak out into the checks inclosed by the levees. This is a garden modification of the rectangular check system and is used in the growing of vegetables and small fruits. It is best suited to porous soils, which require frequent irrigation. A primitive form of this method is ridge irrigation, in which plants are grown on the sides or at the base of raised ditches. 6. Furrow irrigation, or running water in furrows between the rows of crops, is the simplest, cheapest, and most widely used method of irrigating crops which can be grown to advantage in rows and is adapted to a wide range of slope and soil conditions. If the slope is not too great to carry a small stream without excessive washing, the rows are run straight down the grade from the supply ditch or flume, which occupies the crest of the highest ground; otherwise the rows are run diagonally at the angle giving the proper grade. The length of furrow that can be used depends upon the character of the soil and the head of the water. The more porous the soil, the larger should be the stream or the shorter the furrow. For most field and garden crops a larger stream and a shorter run are used than for fruit trees. Laterals or supply ditches are usually taken across the slopes of the land at intervals of about 25 rods. The laterals should be as nearly level as possible, so that they can be kept full and will discharge uniform amounts of water through the openings into the furrows. 7. The corrugation method lies midway between the furrow and flooding methods. After the land is seeded small and shallow furrows or corrugations are made with a marker. These serve as guides to the water, making it wet the field uniformly and preventing the wetting of the surface, which tends to make some soils puddle and bake. 8. Raised-bed irrigation, in which a raised bed is surrounded by a small ditch from which the water passes into the soil by seepage and capillary action, is a modification of the furrow system, especially suited to rather heavy, retentive soils in which water moves readily. 9. Subirrigation, or distribution by means of underground pipes with suitable outlets, or from tile drains or blind ditches, from which the water can rise to the roots of plants by capillarity. The method is expensive and of doubtful practicability, except on a limited scale in greenhouse and other horticultural work. A similar method, known as underflow irrigation, consists in opening furrows at considerable distances apart and keeping them filled with water until the ground water rises so that it can reach the roots of plants by capillarity. The method is little used. 10. Distribution by means of underground pipes, standpipes, and connections for sprinkling is a method which is considered too expensive for use on a large scale.

The choice of a method must be determined by the amount of water available, the slope and nature of the land, the character of the crop, etc.

According to Wickson a method, to be of value, must secure the following results: "(1) distribution of moisture evenly throughout the soil mass to as great a depth as possible, providing it does not sink beyond the reach of the plant by root extension nor beyond recovery by capillary rise; (2) economy of labor both in aggregate time and in the feasibility of operating without employment of extra hands; (3) economy of water in the prevention of waste by overflow or evaporation or by rapid percolation and in placing the water where it will do the most good; (4) leaving the land in the best condition for attaining with least labor a state of tilth which conserves moisture and at the same time favors thrift in the plant." Crops sown broadcast can be irrigated only by flooding, corrugations, or sprinkling. The contour check, border, and furrow method require least labor. The furrow methods are best suited to subsequent cultivation by horse power, which is a matter of great importance, since thorough cultivation, to overcome the compacting tendency of irrigation and to secure a soil mulch, should in all cases follow as soon after irrigation as the condition of the soil will permit. Deep and thorough preparation of the soil increases its storage capacity for water, and frequent cultivation of the surface reduces loss from evaporation, thus reducing materially the amount of irrigation required and enabling the soil to utilize to the best advantage whatever rainfall may occur.

Duty of Water in Irrigation. The relation between the quantity of water used and the acreage irrigated, expressed either in acreage irrigated per unit of volume of water or in quantity of water per unit area of land, is commonly called the duty of water. When the rate of flow is given, the duty is usually expressed in acres irrigated per cubic foot per second, and when the quantity of water is given, the duty is usually expressed in acre feet used per acre irrigated, which represents the depth in feet to which the water used would cover the land if it were all held on the surface, since the acre foot is the quantity of water required to cover one acre to a depth of one foot.

The duty of water is sometimes confused with what is more properly called the water requirements of crops, i.e., the quantity of water actually consumed by plants in the processes of growth. It is not possible to grow crops under arid conditions without supplying water far in excess of the quantity actually consumed by the plants, and duty is an expression of the quantity which must be supplied and includes losses by evaporation from the soil, by percolation beyond the reach of plant roots, and by surface run-off, as well as moisture retained in the soil.

The water requirement of the crop grown is the minimum or ideal duty, towards which careful irrigators work by cutting down all losses so far as practicable. Many experiments have been made to determine the water requirements of various crops; but the more results become available, the more conclusively it is shown that there is no fixed relation between quantity of water and quantity of crop, but that this relation varies with the fertility and moisture content of the soil, the character of the season, and many other conditions. It is evident that when to the variations in the actual moisture requirements of crops there are added the variations in the practically unavoidable losses by evaporation, seepage, and run-off, due to differing soils, subsoils, and climatic conditions, no definite quantitative statements can be made as to the duty of water.

Duty of water measurements have sometimes been divided into those showing gross duty, net duty, and duty for different crops. Gross duty has been applied to results showing the relation between the total amount of water entering a canal system and the acreage served by the system; net duty to the relation between the water delivered to a single farm and the acreage of that farm; while the duty for different crops represents the water applied to individual fields of those crops. The reports of the United States Census for 1910 give returns from something over 800 canal systems, supplying water to 2,500,000 acres of land, which show an average area of 62 acres served per cubic foot per second of average discharge for the season. This agrees almost exactly with general estimates for the arid region of the United States made by well-informed persons. The same report gives returns from nearly 1,000,000 acres for which the quantity of water diverted per acre irrigated was reported, which show an average of 4.8 acre feet per acre, or sufficient water to cover the land irrigated to a depth of 4.8 feet. The average length of the irrigating season for the United States is five months, and during a season of five months one cubic foot per second will supply almost exactly 4.8 acre feet per acre to an area of 62 acres. The United States Reclamation Service reports having delivered 3.5 acre feet per acre in 1910 and 3.7 acre feet per acre in 1911. The average for the two years, 3.6 acre feet, with an allowance of 25 per cent for losses by seepage, would indicate a diversion of 4.8 acre feet per acre. The exact agreement of these figures indicates that the figure given represents correctly the gross duty of water in the United States under present practice. This is a general average, the items varying from 1.5 acre feet per acre or less in places where the land is devoted principally to grain, to 8 or 10 acre feet per acre where the growing season is long and alfalfa is the principal crop. Expressed in acres irrigated per cubic foot per second, the items vary from 50 acres for general crops in northern latitudes to 500 or 600 acres for citrus fruits in southern California.

As already stated, the United States Reclamation Service reports having delivered an average of 3.6 acre feet per acre during the season of 1910 and 1911. The United States Department of Agriculture reported in 1908 measurements from 24 farms scattered throughout the United States, showing an average net duty of 3.34 acre feet per acre. The average of these two quantities, or 3.5 acre feet per acre, is probably representative of common practice in the United States. Very few measurements from other countries are available, but these measurements are probably typical.

In sections where water is scarce and crops are of high enough value to justify large expenditures to prevent losses, many of the losses of water have been eliminated and the duty of water is high. In sections where water is plentiful, or where only crops of low value can be grown, the cost of preventing losses is too high to be met and the duty remains low.

The water necessary to be supplied to different crops has been the subject of much study and experiment in the United States. Experiments have shown that the quantity of water supplied affects not only the quantity of crop produced, but the chemical composition as well as the relative weights of stalks and seed.

There is a very general agreement in the results of experiments showing that, within reasonable limits, the larger the quantity of water supplied, the larger the yield of crop per acre. There is, however, as a rule, a very rapid decrease in the yield of crop per unit of water used as the quantity of water is increased. If, therefore, land is scarce and water is plentiful and inexpensive, it may pay to use much larger quantities than can be used profitably when water is scarce or expensive. On the other hand, where land is plentiful and cheap and water is scarce, it is more profitable to use smaller quantities of water per acre and spread the available water over larger areas. Widtsoe gives the following figures to illustrate this point for Utah conditions:

CROP PRODUCED WITH 30 ACRE INCHES OF WATER USED ON DIFFERENT AREAS

CROP	30 ACRE INCHES SPREAD OVER								
	One acre 30 inches deep	Two acres 15 inches deep		Three acres 10 inches deep		Four acres 7.5 inches deep		Six acres 5 inches deep	
		Total yield	Yield per acre	Total yield	Yield per acre	Total yield	Yield per acre	Total yield	Yield per acre
Wheat, grain (bus.)...	47.51	91.42	45.71	130.59	43.53	166.16	41.54	226.86	37.81
Corn, grain (bus.)....	97.12	187.86	93.93	268.56	89.52	316.56	79.14	....	....
Timothy, hay (lbs.)...	6,054.00	7,688.00	3,844.00	11,739.00	3,913.00	11,928.00	2,982.00	....	....
Alfalfa, hay (lbs.).....	8,840.00	15,093.00	7,546.50	29,653.00	9,884.33	......	.....	....	....
Sugar beets (tons)....	20.82	38.90	19.45	55.89	18.63	64.84	16.21	82.68	13.78
Potatoes (bus.).......	195.00	373.00	186.50	456.00	152.00	544.00	136.00	691.00	115.16

Whether a given quantity of water will produce the largest net return when used on a greater or less acreage will depend in each case on the relative availability of land and water, the cost of land, the cost of water, and the cost of the growing crops aside from the cost of water.

The system of water rights, or of charging for water used, has a large influence on the quantity of water used per acre. The theory of American water law is that the water user is entitled to as much water as he can use beneficially on his land, but that he may not dispose of any water which he cannot use on his own land. Under such a system the whole tendency is for a farmer to use as much water as he can, without injury to his land, since the more water used, the larger return. If he were allowed a fixed quantity of water which he might use on much or little land as he chose, the tendency would be towards the spreading of the water supply over the greatest possible area. Where water is disposed of under contracts, the usual practice is for the company supplying water to agree to furnish sufficient water for land for which rights are purchased for a given sum per acre. Within the limits of the quantity which the farmer can use beneficially, his water costs just the same whether he uses much or little or even if he uses none. From his standpoint it will pay him to put on water until the cost of applying it equals the increased return due to the increased quantity of water used. Here also a system under which the farmer would pay according to the quantity of water used would reverse the tendency and lead to the spreading of the water over the largest possible area. Existing laws and customs are all against an economical use of water. Since, the world over, the acreage which can be irrigated is limited by the water supply, this becomes a serious matter.

Amount and Frequency of Irrigation. The conditions that must be taken into consideration in determining the amount of water to be applied are: (1) the storage capacity of the soil, (2) the depth to which the roots of the particular crop penetrate, (3) the rate at which water will rise from the soil below the root zone, (4) the dryness of the soil and the subsoil, and (5) the water requirements of the crop grown. The frequency of irrigation will be determined by: (1) the amount of available moisture which the soil can store, (2) the rate at which moisture is lost by transpiration through the plant and by evaporation from the soil, (3) the degree of dryness of the soil which the plant will tolerate without injury, and (4) the stage of plant growth. Where the soil is deep and mellow, the roots of plants extend to a great depth and over a wide area. Thus, having a wider field from which to draw supplies of moisture and plant food, the actual percentage of moisture in the soil may be smaller without detriment to the plant than if the root feeding were more restricted. Again, compact, clayey soils hold moisture so tenaciously that plants growing on them begin to suffer for moisture, even when the soil contains a percentage of water which in case of less tenacious, sandy soil would be abundant for the plants' needs. The aim in irrigating should be to apply simply enough water to meet the needs of the plant without loss in the drainage. It is well to bear in mind, in attempting to accomplish this desired result, that plants vary in their water requirements at different stages of growth. Three to five irrigations seem to be about the average for wheat. With maize the number of irrigations needed varies from 3 in Italy to 15 in Egypt, but 5 to 7 irrigations appear to be about the average. It is usual to give only one irrigation for each crop of clovers and alfalfa. Water meadows are irrigated as often as the water supply will permit. The practice with potatoes is to give 2 to 4 irrigations, according to the slope and texture of the soil, beginning when the plants have nearly or quite reached the blossoming stage. In actual practice the intervals between irrigations of fruit trees and vineyards vary from 7 to 40 days. According to Wickson, fruits in California receive 2 inches of water per month during May to August, on retentive soils, and 3 inches during the same period on coarse soils. In rice culture the land is kept flooded the greater portion of the time during the growth of the crop. According to Maxwell, it is a common practice in Hawaii to apply 200 to 250 acre inches of water to sugar during a growing period of 18 to 20 months, although experiments have shown that 100 acre inches is ample.

Division and Measurement of Water. Successful irrigation is very largely dependent upon the judgment of the irrigator, and this in case of an expert is probably as reliable as measurements, in our present knowledge of the duty of water. Measurements, however, are necessary when many irrigators draw their water supply from the same source. In this case various methods of division and measurements are used. When the supply is small and the whole of it can be used by each irrigator to advantage, water is often distributed on the time basis, allowing each user to have the whole stream a length of time proportionate to the amount of water to which he is entitled. By this method there is a rotation in the use of water. When the supply is too large to be used by a single individual, various devices, called divisors, are used to apportion to each user the proportion of water to which he is entitled, or modules, measuring weirs, and spill boxes are employed to measure to each irrigator a definite quantity

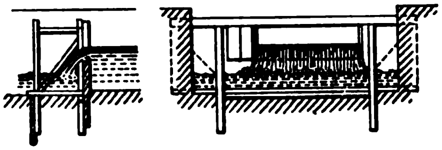

FIG. 13. MEASURING WEIR.

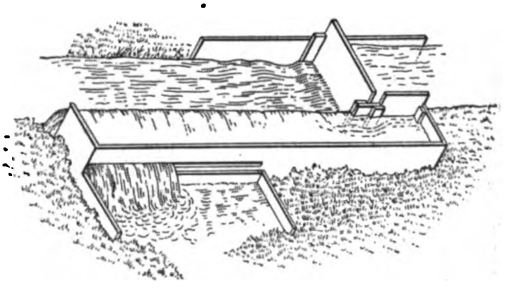

FIG. 14. FOOTE'S MEASURING WEIR AND SPILL BOX.

FIG. 15. DIVISION BOX.

of water. This division and measurement of water for irrigation is controlled by law. The right or privilege of using water from a canal, ditch, or stream in definite quantity or upon a prescribed area of land is termed a water right, and such right or privilege is usually acquired either by priority of use or by purchase. In an arid region, where so much depends upon the supply of water, a water right is a very valuable property. See HYDROGRAPHY; WATER SUPPLY.

Quality of Irrigation Water. The character of the water available for irrigation purposes is a matter of great importance. All natural waters carry more or less organic and mineral matter in suspension or solution and thus furnish, in addition to the water so necessary for the growth of plants, a certain amount of fertilizing matter. Waters carrying a large amount of soluble matter should, however, be used with caution, since they may cause the accumulation of alkali in the soil in injurious amounts. Of the waters available for irrigation, sewage is most valuable on account of the fertilizing matter carried to the land. Sewage irrigation is practiced with success in Great Britain and on the continent of Europe, notably on the Craigenlinny meadows, near Edinburgh; at Gennevilliers, near Paris; in the vicinity of Berlin; at Milan, Italy; and also at a number of places in the United States.

Laws and Institutions. As the water supply for irrigation comes largely from streams which serve also for domestic supply, power development, and navigation, the use of water for irrigation has always been subject to more or less public control and consequently the subject of legislation. The matter has been dealt with on three distinct legal theories. Under the Roman, or civil, law the water of streams is held to belong to the state or the crown, and rights to its use are required by grant; under the English, or common, law the right to use the water of streams attaches to the ownership of lands abutting on the stream; and under American legislation and judicial decisions in the arid States the water of streams belongs to the public, and its use is controlled by the States under their police power. In India, where more land is irrigated than in any other country, the use of water is controlled by the state.

Each of the arid States of the United States, except Arizona, California, Colorado, Montana, and Washington, has enacted laws under which a person wishing to acquire a right to water for irrigation must apply to the State for such right, and must submit to the State proof of having complied with the conditions prescribed by the State. In these States and in Colorado diversion from streams is controlled by State officials, the water being distributed in accordance with rights acquired under the State laws. In Arizona, California, Montana, and Washington rights are acquired by posting and filing notices of what is claimed, building works to convey the water to the place of use, and actually putting the water to use. Rights so acquired are protected by the courts.

In the United States about two-fifths of the land irrigated is supplied by works built and controlled by individual farmers or a few neighbors without formal organization. The most common form of organization for controlling the larger enterprises is the stock company, the stock of which is owned by the water users. In 1910 such companies supplied water to about one-third of the acreage irrigated. A small part of the land is watered by works controlled by irrigation districts, which are public corporations having power to issue bonds to obtain funds for construction or purchase of works and to levy and collect taxes to pay off their bonds and cover interest and operation and maintenance charges. In 1894 the Federal Congress passed what is known as the Carey Act, under which the Federal government granted to each of the States containing arid land 1,000,000 acres of such land on condition that the State provide for its irrigation. A small area of land has been reclaimed under this law. In 1902 Congress passed the Reclamation Act, under which works are built directly by the Federal government with the proceeds from the sale of public lands. The law requires that the water users shall repay to the government the cost of construction, after which the works are to be turned over to the water users. The repayments are to be used for building other works, thus constituting a revolving fund. At the end of the first 10 years of operation about 3,000,000 acres were included in projects being built under this law, and about 500,000 acres were being irrigated. Works built under both the Carey Act and the Reclamation Act are to be turned over to the water users, and consequently it can be stated that in the United States nearly all of the irrigation enterprises are controlled by the water users or will be so when completed.

In India the larger irrigation works are built and controlled by the British government, which gets its returns principally by taxation of the crops grown. Approximately one-half of the land irrigated is supplied by works built and controlled by the native states or by individuals and communities. In Egypt the works are built and controlled by the government, which gets its returns there, as in India, by taxation of the crops grown. In Australia most of the works are built by the states, which levy charges for water used. In Italy some canals are controlled by the national government, some by the provinces, some by local associations, and still others by individuals. The national and provincial governments contribute to the cost of works built by local associations. Brazil has a similar scheme of aiding local agencies in the construction of irrigation works. Mexico has created a bank for aiding in the financing of irrigation enterprises, which are built by private corporations under government concessions.

The largest irrigation enterprises in Canada are owned by the Canadian Pacific Railway Company, and one of their most important projects is southeast of Calgary in the Province of Alberta. This irrigation area is on the North or Red Deer River slope of the divide, and the total irrigable area is, in round figures, some 440,000 acres. There is involved a canal system with various flumes, conduits, ditches, and laterals, with a total mileage of canals and ditches in excess of 3000. This is the largest irrigation project of the American continent and exceeded by few outside of India. The most important engineering feature of this work is the Bassano Dam, a composite structure, consisting of an earth embankment 7000 feet long with a maximum height of 35 feet, combined with an Ambursen hollow reënforced-concrete dam 750 feet between abutments and 39 feet high to the crest. There are 24 openings, each 27 feet long, with Stoney gates 11 feet high and a reënforced-concrete headwork at right angles to the dam proper, and five 20-foot openings, each of which is closed by Stoney gates 14 feet high. This dam was designed to pass 100,000 second feet of water with 14 feet on the crest.

Irrigation in Humid Climates. Supplemental irrigation to carry crops through periods of drought has been found profitable in many cases in humid regions, especially on light, well-drained soils and with crops of high value. To what extent the practice may be extended with advantage has not been definitely determined. The rainfall of such regions is a disturbing factor. If a heavy rain occurs soon after a thorough irrigation, more serious damage may be done by excess of water than would have resulted from drought, especially if the soil be compact and poorly drained. Irrigation should therefore be attempted in such regions only on soils provided with thorough natural or artificial drainage.

Bibliography. The more important literature relating to irrigation includes publications of the United States Department of Agriculture on irrigation; Water-Supply and Irrigation Papers and other publications of the United States Geological Survey, Division of Hydrography; *Report of a Senate Committee for Irrigation and Reclamation of Arid Lands* (Washington, 1890); *Special Reports to Congress on Irrigation in the United States* (ib., 1891); Hinton and others, *Artesian and Underflow Investigations* (ib., 1892); Chittenden, *Report to Congress on Reservoir Sites in Wyoming and Colorado* (ib., 1898); Newell, "Irrigation," in the *Eleventh* and *Twelfth United States Census Reports*, and Teele in *Thirteenth United States Census Report* (ib., 1890, 1900, and 1910); reports and bulletins on irrigation of the agricultural experiment stations in Arizona, California, Colorado, Montana, Utah, and Wyoming, and the reports of the State engineers of these and other States in the arid regions; Baird-Smith, *Italian Irrigation* (London, 1855); Parral, *Les irrigations dans les bouches du Rhône* (Paris, 1876); Stewart, *Irrigation for the Farm, Garden, and Orchard* (New York, 1877); Ross, *Notes on Distribution of Water of Upper Egypt* (Cairo, 1882); Stephens, *Practical Irrigator and Drainer* (Edinburgh, 1884); Llaurado, *Tratado de aguas y riegos* (Madrid, 1884); Deakin, *Irrigation in Western Australia* (Melbourne, 1885); Hall, *Irrigation Development and Irrigation in California* (Sacramento, 1886–88); Ronna, *Les irrigations* (Paris, 1889–90); Flynn, *Irrigation Canals and Other Irrigation Works* (San Francisco, 1892); Buckley, *Irrigation Works in India and Egypt* (London, 1893); Wilcox, *Irrigation Farming* (New York, 1893); Dennis, *Reports on Irrigation and Canadian Irrigation Surveys* (Ottawa, 1894–96); Moses, *L'Irrigation en Asie centrale* (Paris, 1894); Scott, *Irrigation and Water Supply* (London, 1895); Willcocks, *Egyptian Irrigation* (ib., 1899); King, *Irrigation and Drainage* (New York, 1899); Salvador, *Hydraulique agricole* (Paris, 1900); Long, *Irrigation Law* (St. Paul, 1901); Newell, *Irrigation in the United States* (New York, 1902); Schuyler, *Reservoirs for Irrigation* (ib., 1902); Brunhes, *L'Irrigation dans la peninsule ibérique et dans l'Afrique du nord* (Paris, 1902); Mead, *Irrigation Institutions* (New York, 1903); Wilson, *Manual of Irrigation Engineering* (ib., 1903); Risler, *Irrigations et drainages* (Paris, 1904); Newell and Murphy, *Principles of Irrigation Engineering* (New York, 1913). Bibliographies of irrigation will be found in the Annual Report of the Colorado Experiment Station for 1891 (Fort Collins, Colo.), and in the *Eleventh Annual Report* of the United States Geological Survey, 1889–90, part ii (Washington, 1890), and also in *Bulletin No. 41* of the Library of the United States Department of Agriculture by E. A. Hedrick (ib., 1902).

See AQUEDUCT; CANAL; CONSERVATION; DAMS AND RESERVOIRS; FLUME; HYDROGRAPHY; PUMPS AND PUMPING MACHINERY; SEWAGE DISPOSAL; TUNNEL; WATER METER; WATER SUPPLY.

IR'RITABIL'ITY (Lat. *irritabilitas*, from *irritabilis*, irritable, from *irritare*, to irritate). The state or condition of the protoplasm of plants when it responds to a change in external influences or the adjacent protoplasm. The change which initiates the response is called a stimulus. When the nature of the stimulus is unknown, automatism is predicated rather than irritability. Temporarily the protoplasm may lose the power of responding to a stimulus, but when this is permanently lost the protoplasm is dead. Temporary loss of irritability may be occasioned by prolonged or repeated stimulation, in which case the loss is said to be due to fatigue; or by unfavorable conditions, such as deficient moisture, low or high temperature, lack of oxygen, anæsthetics, etc. Under such conditions the protoplasm is said to be in a state of rigor.

The agents affecting plants are extremely numerous and varied. The light changes both in intensity and direction from hour to hour; the temperature fluctuates; the moisture in air and soil is seldom the same for two consecutive days. The nature of the stimulus does not directly determine the character of the response, but this is conditioned by the mechanism which the stimulus sets in action. As there is unlikeness between stimulus and reaction, so there is disproportion between them in the energy involved. Although the stimulus stands to the reaction apparently in the relation of cause to effect, it only initiates a series of changes, in the course of which the energy liberated by increased respiratory activity produces, through the appropriate mechanism, the result observed. The stimulus is only a releasing cause, and, were the energy not provided by respiration, no reaction would occur. The only apparent exception to this is seen when a stimulus inhibits the action of an organ whose normal function requires the expenditure of energy. Here the release of energy seems to be prevented. In the absence of exact knowledge as to how this is accomplished, it may be assumed that it is by counteraction rather than by suppression.

Not all portions of the plants are equally sensitive to a given stimulus. Indeed, in many cases the sensitive regions are sharply localized and very limited. It has been shown, e.g., that sensitiveness of a root to the stimulus of gravity resides mainly in the terminal 1.5 to 2.5 millimeters. In other parts the whole growing region may be sensitive. When the sensitive region is sharply localized, it may be coincident with the region in which the response is perceived, or it may be separated from it by a considerable distance. In the latter case a propagation of the stimulus must occur. There are in plants no definite structures corresponding to the nerves of animals, but the conduction is mainly through living active parenchyma cells or along such living cells as the sieve tubes or companion cells. Setting in action the mechanism of perception, the propagation of the stimulus, and the execution of the final response consume time. In some plants the final response follows in a fraction of a second after the stimulus is received, as in the sensitive plant. In most cases, however, the end reaction is separated in time from the initiation of stimulation by seconds, minutes, or even hours. This interval is known as the reaction time. When it is sufficiently long, a stimulus may be applied during a portion of the reaction time and then discontinued. After the usual interval, however, the reaction will still occur, although no stimulus is then operating. Such effects, the results of previously acting stimuli, are known as "after effects." The time during which any stimulus must act in order to call forth a response is the presentation time.

The reaction to a stimulus may consist in a growth or turgor movement, in a change in rate, or in a general change in the course of development of the organ. Further, the reaction may be either direct or induced. Induced reactions are such as will not occur in response to the stimulus acting unless some other stimulus first brings about a change; after which reaction to the first stimulus becomes possible. Thus, a plant may not respond to stimulation by gravity unless it is first stimulated by light. It is difficult, therefore, to disentangle the effects of different stimuli without extreme care in experimentation. Every living cell of the plant is in reality an irritable structure. Since movement is the most easily observed reaction, the mistake has been made of considering motor organs as being specially irritable regions. Thus, tendrils, the leaves of the sensitive plant, the peculiar motile leaves of the Venus's flytrap, the tentacles of the leaves of *Drosera*, the contractile filaments of many anthers, etc., are looked upon as sensitive organs par excellence. In reality, however, many of these are far inferior in sensitiveness to structures whose reactions are less evident. See BIOLOGY.

IR′RITANCY (from *irritant*, from Lat. *irritare*, to render void, from *irritus*, *inritus*, invalid, from *in-*, not + *ratus*, decided, p.p. of *reri*, to think). In Scottish law, the forfeiture of an estate as the result of a breach of condition, express or implied, or the happening of an event upon which the termination of the estate is made to depend. The irritant or fatal condition, or proviso, may be an incident of the estate granted, as the duty annexed to a feudal freehold, or it may be the result of an express provision, known as an irritant clause, contained in the deed creating the estate affected by it. See CONDITION; FORFEITURE.

IR′RITANT (from Lat. *irritare*, to irritate, annoy). An agent that causes increased circulation, pain, increased function, or muscular contraction, when applied to an animal tissue. Among the irritants are many vegetable and the mineral acids, strong alkalies, bichloride of mercury, nitrate of silver, mustard, croton oil, turpentine, etc. The term has been sometimes vaguely applied to medicines which produce irritation of nerves in distant parts when taken internally, as instanced in the action of strychnine upon the spinal cord. Heat is a mechanical or kinetic irritant. Light is also an irritant to the retina and in diseases of the eye is often a powerful one. Electricity is an irritant when applied in certain forms. See COUNTERIRRITANTS.

IRTYSH, ĭr-tĭsh′. An affluent of the Obi, and fourth in importance among the rivers of Siberia (Map: Asia, J 3). It rises in the southwest range of the Altai Mountains in China, frequently called here the Urungu, whence it flows in a northwest direction through Lake Zaisan-Nor, past the city of Tobolsk, until it reaches the Obi, after a course of 2633 miles. Its chief affluents are the Bukhtarma, the Om, and the Tara from the right; and the Ishim, the Tobol, and the Konda from the left. The basin of the Irtysh, comprising the governments of Tomsk, Tobolsk, Perm, and Orenburg, the territories of Akmolinsk, Turgay, and Semipalatinsk, and some Chinese territory, covers the immense area of 638,000 square miles. The Irtysh is ice-free about 200 days in the year and is navigable for nearly 2000 miles. The principal ports are Semipalatinsk, Pavlodar, Omsk, Tara, and Tobolsk.

IRUN, ė-rōōn′. A frontier town of Spain, in the Province of Guipúzcoa, situated on the Bidassoa River, here forming the French boundary, 5 miles from its mouth in the Bay of Biscay. It is a military station and a first-class port of entry. It contains an interesting old church, restored in 1508, and has manufactures of leather, tiles, and bricks. It is also the centre of a flourishing mining and agricultural district and the terminus of a number of electric and steam railroads. Pop., 1910, 10,629.

IRVINE, ẽr′vĭn. A royal, municipal, and police borough and a seaport in Ayrshire, Scotland, on the Irvine, a mile above its mouth, in the Firth of Clyde, 29 miles southwest of Glasgow (Map: Scotland, D 4). It has a good town hall, an academy, and a fever hospital; also the ruins of two Norman castles. Shipbuilding, iron founding, and the manufacture of machinery, soap, chemicals, book muslins, jaconets, and checks are the chief branches of industry. Duntonknoll Quarry yields a stone largely used for the making of bakers' ovens. Neighboring coal mines yield the principal article of export. Since 1875, when its harbor was dredged, it has gradually regained its lost shipping. The principal features of the town are the municipal building, a fine bridge, and the academy, an educational institution of high repute. The town owns its water works. Mentioned in 1184, Irvine is described as a chartered burgh in the reign of Robert Bruce. Pop., 1901, 9618; 1911, 10,180.

IRVINE, WILLIAM (1741–1804). An American soldier. He was born in Ireland, graduated at Dublin University, and was surgeon on an English warship during the Seven Years' War, at the close of which (1763) he emigrated to America and settled at Carlisle, Pa. In 1774 he was a member of the Provincial Convention, and in January, 1776, was appointed colonel of the Sixth Pennsylvania Regiment. At the battle of Three Rivers, in June, 1776, he was made prisoner and, though soon paroled, was not exchanged until May, 1778. He became a brigadier general May 12, 1779, serving with Lord Stirling on his expedition against Staten Island, and with General Wayne at Bulls Ferry in July, 1780. In 1782–83 he had command at Fort Pitt of the troops for the defense of the western frontier, and in 1785 acted as agent of his State for the distribution of the public lands among the soldiers. During his term of office he recommended the purchase of the "triangle" tract, which gave Pennsylvania her outlet on Lake Erie. He was elected to Congress in 1786 and was made one of a commission of three to adjust the accounts of the Confederation with the various States. He also was a member of the convention called to revise the State constitution, and of that by which the Federal Constitution was ratified for Pennsylvania. From 1793 to 1795 he was again a member of Congress, and in 1794, during the Whisky Insurrection (q.v.), commanded the Pennsylvania militia. He subsequently removed to Philadelphia and at the time of his death was president of the Pennsylvania branch of the Society of the Cincinnati.

IRVING, ẽr'vĭng, Edward (1792–1834). An eloquent and distinguished Scottish clergyman. He was born at Annan, Dumfriesshire, Aug. 4, 1792. He studied at the University of Edinburgh and, after completing his curriculum for the ministry in 1809, became a school-teacher at Haddington and later at Kirkcaldy. At the former place one of his pupils was Jane Welsh, and at the latter began his friendship with her future husband, Thomas Carlyle. He was licensed as a preacher in 1815, but his early attempts at preaching were not successful. In 1819 he became assistant to Dr. Thomas Chalmers in Glasgow. Here he felt himself overshadowed by his more famous colleague, and in 1822 he accepted a call to the Caledonian Church, Hatton Garden, London. His success as a preacher in the metropolis was unparalleled. In brief time he transformed a poor and obscure congregation into a rich and fashionable one and exchanged the humble chapel for a handsome structure on Regent Square. In 1823 he published his first important work, *The Oracles of God: Four Orations, with an Argument on Judgment to Come*. At the close of 1825 he began to announce his convictions in regard to the second personal advent of Christ, which he declared to be near at hand. This was followed by his translation of a Spanish work, *The Coming of the Messiah in Glory and Majesty*, which professed to be written by a Christian Jew, Juan Josafat Ben Ezra, but was in reality the composition of a Spanish Jesuit, Manuel Lacunza. In 1828 appeared his *Homilies on the Sacraments*. He now began to elaborate his views of the incarnation of Christ, asserting the doctrine of His oneness with man in all the attributes of humanity. The language which he used on this subject drew upon him the accusation of heresy, to which he gave little heed. He was deep in the study of the prophecies; and when the news came to London in the early part of 1830 of certain extraordinary manifestations of prophetic power in the west of Scotland, Irving was prepared to believe them. In 1831 he published *An Exposition of the Book of Revelation*. Irving was arraigned before the presbytery of London in 1830 and convicted of heresy, ejected from his new church in Regent Square in 1832, and finally deposed in 1833 by the presbytery of Annan, which had licensed him. The majority of his congregation adhered to him, and gradually a new phase of Christian order and worship was developed, commonly known as Irvingism, though Irving had really very little to do with its development. (See Catholic Apostolic Church.) Shortly after, his health failed, and, in obedience, as he believed, to the Spirit of God, he went to Scotland, where he sank a victim to consumption. He died at Glasgow, Dec. 7, 1834. Irving's works were published in London (5 vols., 1864–65). Consult: M. O. W. Oliphant, *Life of Edward Irving* (2 vols., London, 1862); J. W. Carlyle, *Letters and Memorials* (2 vols., New York, 1903); Thomas Carlyle, *Critical and Miscellaneous Essays* (3 vols., ib., 1903).

IRVING, Sir Henry (1838–1905). A distinguished English actor and manager. He was born at Keinton Mandeville, Somersetshire, Feb. 6, 1838, his name being originally John Brodribb; his stage name of Irving was legalized by royal license in 1887. He was carefully educated at a private school and then placed in a commercial situation, but he early began preparing himself for a dramatic career, and made his first appearance on the professional stage at Sunderland in 1856, as Gaston, Duke of Orléans, in *Richelieu*. After playing in Edinburgh, Glasgow, Manchester, and elsewhere, not without meeting frequent discouragements, he appeared in 1866 at the St. James's Theatre in London. He soon became noted as an interpreter of light comedy parts, and more especially as the "heavy villain" in such rôles as Robert Macaire and Bill Sikes. But his first great success was as Digby Grant in the comedy of *Two Roses* (1870), which he performed at the Vaudeville Theatre for 300 consecutive nights. In November, 1871, he was engaged by the Lyceum Theatre and increased his reputation by his appearance in *The Bells*, as Mathias (1871), in *Eugene Aram* (1873), *Richelieu* (1873), and *Hamlet* (1874). The peculiarities of his style in *Hamlet* excited great difference of opinion among the critics, which continued over his rendering of *Macbeth* (1875) and *Othello* (1876, and again with Edwin Booth in 1881), but the importance of his position constantly increased. His *Richard III* (1877) and his *Louis XI* (1878) attracted great admiration. In 1876 he made a tour through Scotland, Ireland, and the provinces. The withdrawal of Mrs. Bateman from the management of the Lyceum gave Irving, in 1878, entire control over the theatre in which he had long been the leading attraction; he secured Miss Ellen Terry, and together they inaugurated a series of brilliant performances which continued, with brief interruptions, till 1903. Irving as a manager was famous for the carefully elaborate stage setting of his productions, while as an actor he was distinguished for the psychological force of his characterizations. His theatre became in all its appointments and in the class of the plays produced there the most admirable of London playhouses, though its financial success left something to be desired. In 1899 the Lyceum passed into the hands of a limited liability company, though still under Irving's direction. In the long list of rôles which he assumed after his management began were Shylock (1879); Benedick, in *Much Ado about Nothing* (1882); Mephistopheles, in *Faust* (1885), which proved one of the most popular of his presentations, though critically less admired; Becket (1893), in Lord Tennyson's drama, which he rearranged for the stage; and Robespierre (1899), in the play written for him by Sardou.

He first came to the United States, with Miss Terry and the other members of his company, in 1883, when he made his New York début as Mathias, in *The Bells*. The welcome which he won on this first visit was frequently repeated, and he reproduced in the United States most of his London successes. Irving was knighted in 1895, the first actor who ever received this honor. Among his publications is *The Drama: Addresses* (London, 1892). The Irving Edition of Shakespeare (ed. by Henry Irving and F. A. Marshall) appeared in 1887–90 (London).

Irving's marriage in 1869 to Miss Florence O'Callaghan gave him two sons, Henry Brodribb Irving and Lawrence Irving (qq.v.).

Irving died suddenly in October, 1905, at Bradford, England, after a performance of *Becket* in which he had shown unusual power. His body was placed in Westminster Abbey beside the ashes of Garrick and under the shadow of the Shakespeare statue.

Bibliography. William Archer, *Henry Irving, Actor and Manager* (London, 1883); Arnold Daly, *Henry Irving in England and America, 1838–84* (ib., 1884); Hatton, *Henry Irving's Impressions of America* (ib., 1884); Scott, *The Drama of Yesterday and To-Day* (ib., 1899); P. H. Fitzgerald, *Sir Henry Irving: A Biography* (New York, 1906); H. Macfall, *Sir Henry Irving* (ib., 1906); B. Stoker, *Personal Reminiscences of Henry Irving* (ib., 1906); A. Brereton, *Life of Henry Irving* (2 vols., ib., 1908); W. H. Pollock, *Impressions of Henry Irving* (ib., 1908).

IRVING, HENRY BRODRIBB (1870–). An English actor, manager, and author, son of Sir Henry Irving. He was born in London, was educated at Marlborough and at New College, Oxford, and in 1894 was called to the bar. But as early as 1891 he had appeared on the stage in John Hare's company, and he soon gave up law to follow in his father's footsteps; in 1894–95 he was with Comyns Carr at the Comedy Theatre, in 1895 with Ben Greet's company in the provinces, in 1896 with George Alexander at the St. James's. In the latter year he married Dorothea Baird, who created the rôle of Trilby. His success as an actor was followed by success as a manager. In 1902 he took the Duke of York's Theatre; in 1906–07 toured America, in 1911–12 Australia, and in 1912–13 South Africa; and then leased the Savoy. He played Crichton in Barrie's *Admirable Crichton* in 1903, and Hamlet at the Adelphi in 1905. *The Lyons Mail* had a remarkable run in 1908, and among his later productions were *Dr. Jekyll and Mr. Hyde* and *The Bells*. His early training for the bar and his sense of the dramatic are seen in his *Life of Judge Jeffreys* (1898), *French Criminals of the Nineteenth Century* (1901), *Occasional Papers* (1906), *The Trial of Franz Müller* (1911), *The Trial of Mrs. Maybrick* (1913).

IRVING, ISABEL (1871–). An American actress, born at Bridgeport, Conn. She first appeared upon the stage in 1887, in *The Schoolmistress*, at New York, and the next year became a member of Daly's company, with which she continued till 1894. She became in 1897 John Drew's leading woman, appearing with him in *The Liars* (1898), *The Tyranny of Tears* (1899), and other pieces. At the beginning of 1902 she became leading woman in William Faversham's company. She was "starred" in 1907 in *Susan in Search of a Husband* and *The Girl who has Everything*. In 1910 she appeared in New York as Mrs. Dallas-Barker in *Smith* and in 1912 as Dulcie Anstice in *Preserving Mr. Panmure*. She was married in October, 1899, to W. H. Thompson. Consult L. C. Strang, *Famous Actresses of the Day in America* (New York, 1900).

IRVING, JOHN BEAUFAIN (1826–77). An American genre and historical painter, born in Charleston, S. C. He was a pupil of Leutze at Düsseldorf, and after the Civil War removed from his native city to New York. He was elected to the National Academy in 1872. Among his pictures are: "The Splinter"; "Wine Tasters" (1869); "The End of the Game"; "Cardinal Wolsey and his Friends" (1876); "A Banquet at Hampton Court in the Sixteenth Century." His bright color and elaboration of detail suggest the Düsseldorf school and have caused him to be called an admirer of Meissonier.

IRVING, JOHN DUER (1874–). An American economic geologist, born at Madison, Wis. In 1896 he graduated from Columbia University (Ph.D., 1899). Joining the United States Geological Survey in 1899, he was assistant geologist in 1900–06 and geologist in 1906–07. He was acting professor of mining and geology at the University of Wyoming in 1902–03 and became assistant professor (1903) and professor (1906) of geology at Lehigh University and in 1907 professor of economic geology at the Sheffield Scientific School (Yale). In the summer of 1907 he made investigations in Alaska for the Guggenheim and Morgan interests. He became editor of the journal *Economic Geology* and is author of *Economic Resources of the Northern Black Hills*.

IRVING, LAWRENCE (SYDNEY BRODRIBB) (1872–1914). An English actor and manager, son of Sir Henry Irving. He was educated at Marlborough College and at the Collège Rollin in Paris and lived in Russia for three years while he was studying for the diplomatic service. In 1893 he appeared in Shakespearean parts in Dundee. He starred in provincial companies, acting *A Bunch of Violets*, *Trilby*, and *Under the Red Robe* in 1896–99; played in his father's company in 1900–04; toured in 1904–05 with his wife, Mabel Lucy Hackney; created the rôle of Crawshay in *Raffles;* presented his own vaudeville sketches in England and America in 1908–09; and as his own manager brought out *The Unwritten Law* at the Garrick in London in 1910. In 1912 he played Iago in Tree's production of *Othello*, at His Majesty's Theatre. On his way back to England in May, 1914, returning from a tour with his own company, he was drowned in the *Empress of Ireland* disaster when endeavoring to save his wife. He wrote several plays, *Peter the Great* (played 1898), *Bonnie Dundee*, *Richard Lovelace* (produced in New York, 1901), and *The Typhoon* (1913), after Lengyel; and translated from Gorky, *The Lower Depths* (1912).

IRVING, ROLAND DUER (1847–88). An American geologist, born in New York City and educated at the School of Mines of Columbia University. Upon graduation, he was made assistant on the geological survey of Ohio and in 1870 was appointed professor of geology and mineralogy in the University of Wisconsin, also serving as assistant State geologist (1873–79). In this connection he published *Geology of Central Wisconsin* (1877); *Geology of the Lake Superior Region* (1880); *Crystalline Rocks of the Wisconsin Valley* (1882); *Mineralogy and Lithology of Wisconsin* (1883). In 1882 he was placed at the head of the Lake Superior division of the United States Geological Survey. His important reports, published by the government, include: *The Copper-Bearing Rocks of Lake Superior* (1883); *On Secondary Enlargements of Mineral Fragments in Certain Rocks* (1884); *The Classification of the Early Cambrian and Pre-Cambrian Formations* (1886).

IRVING, WASHINGTON (1783–1859). An American author. He was born in New York City, April 3, 1783. His mother was English, and his father had come from Scotland to New York City, where he engaged in trade. Irving studied in the schools of New York and at the age of 16 took up law. Before he was 20 he contributed, under the pseudonym of "Jonathan Oldstyle," to the New York *Morning Chronicle*, of which his brother was editor. Never in these early years in good health, he was obliged in 1804 to go to Europe, where he remained two years. Shortly after his return he published, in 1807, with his brother William and James K. Paulding (q.v.), *Salmagundi*, an undertaking in the style of Addison's *Spectator*. In 1809 appeared *A History of New York from the Beginning of the World to the End of the Dutch Dynasty, by Diedrich Knickerbocker*—a humorous, whimsical, and genially satirical sketch, which brought him reputation and money. This book had been begun with the intention of burlesquing a pretentious guidebook by Dr. Samuel Mitchell. The *Knickerbocker History*, to give it its most common name, grew as Irving's humor found more and more curiosities in the quaint and phlegmatic Dutch type, which is so strongly contrasted with the quick and more volatile descendant of British stock. He then gave up any idea of law and became a sleeping partner of his brothers, whose business house was in Liverpool, occupying himself meanwhile with literary work. Irving's reputation had preceded him to England, where his gracious manners made him a favorite in society. He met Campbell and Thomas Moore and was heartily liked by Walter Scott, who persuaded Murray to publish *The Sketch-Book*. Among other things he edited *The Poetical Works of Thomas Campbell*. During the War of 1812 he was on the staff of Governor Tompkins, of New York, and was connected with the *Analectic Magazine* of Philadelphia. In 1815 he went to Europe to look out for the business interests of the firm, the failure of which in 1818 turned him for good and all to literature.

In New York and in London (1819–20) Irving published the book by which he is most popularly known, *The Sketch-Book of Geoffrey Crayon, Gent*. It was heartily welcomed on both sides of the Atlantic, and two of the stories especially, *Rip Van Winkle* and the *Legend of Sleepy Hollow*, have become classics in American literature. The *Sketch-Book* soon went through many editions, was illustrated by Caldicott and commentated by Pfundheller for the Germans. The vein of the book is one of humor, tenderness, geniality, and good-fellowship; the manner is reminiscent of Goldsmith and other English authors of the eighteenth century, to whom Irving was temperamentally drawn. The spirit that animated Irving in all of his writing, save that which was distinctly historical, is admirably expressed by his own *apologia* in the *Sketch-Book:* "It is so much pleasanter to please than to instruct—to play the companion rather than the preceptor. What, after all, is the mite of wisdom that I could throw into the mass of knowledge; or how am I sure that my sagest deductions may be safe guides for the opinions of others? But in writing to amuse, if I fail, the only evil is in my own disappointment. If, however, I can by any lucky chance, in these days of evil, rub out one wrinkle from the brow of care, or beguile the heavy heart of one moment of sorrow; if I can now and then penetrate through the gathering film of misanthropy, prompt a benevolent view of human nature, and make my reader more in good humor with his fellow beings and himself, surely, surely, I shall not then have written entirely in vain." In 1822 appeared another volume in much the manner of the *Sketch-Book, Bracebridge Hall, or the Humorists*, a series of sketches, translated into German by Spiker (1826). In 1822 Irving visited the Rhine, lived for a while in Paris, and again in England in 1824. In 1824 appeared the *Tales of a Traveller*, a collection of short stories, with the same general good feeling, but with more action. In 1826 he went to Spain, remaining there until 1829, and, as a result of his stay, produced four books quite different from his former work: *History of the Life and Times of Christopher Columbus* (1828); *A Chronicle of the Conquest of Granada* (1829), an interesting narrative, but of no real historical value; *Voyages and Discoveries of the Companions of Columbus* (1831); and *The Alhambra* (1832), a series of sketches and stories associated with the author's life in the romantic ruins of Granada. Irving's book on Columbus was written with the help of Spanish archives, after Irving had given up his original purpose to translate Navarrete's recently published work on the discoverer. *The Chronicle of the Conquest of Granada* purports to be founded on the manuscripts of Fray Antonio Agapida, an imaginary chronicler. *The Alhambra* was written mainly in London, where Irving was Secretary of the United States Legation from 1829 to 1831. He returned to America in 1832, where he was welcomed with almost national honor; for the people of the United States knew that he had won recognition abroad for American literature.

In 1841 Irving was appointed United States Minister at Madrid, where he lived from 1843 to 1846, continuing his historical writing with the work on Mahomet. He passed the rest of his life, with the exception of some months of travel in the West, at Sunnyside, his country seat near Tarrytown, N. Y. From the appearance of *The Alhambra* up to 1849 his literary work was inferior to what he had previously done and is of no great charm or value. It consists of *The Crayon Miscellany* (1835); *Astoria* (1836); and *The Rocky Mountains: or, Scenes, Incidents, and Adventures in the Far West* (1837). The work which came towards the end of his life, however, added to his reputation. It was chiefly biographical and historical: *Oliver Goldsmith* (1849); *Mahomet and his Successors* (1849–50); *Wolfert's Roost* (1855); and his long-planned and affectionate *Life of Washington* (1855–59), which he completed only with the year of his death. He died at Irvington, N. Y., Nov. 28, 1859. Posthumously there appeared *The Life and Letters of Washington Irving* (1862–64) and *Spanish Papers and Other Miscellanies* (1866), edited by his nephew, P. M. Irving. His *Works*, in 27 volumes, appeared in New York in 1884–86.

Selections from them in English and in German, with illustrations by Ritter and Camphausen, were published in Leipzig in 1856. The standard *Irving* is now the 40-volume Knickerbocker Edition (New York, n. d.), which is based upon the edition revised by the author and published in the middle of the last century.

Irving is significant in the history of American letters as the first American, after the independence of the United States, to obtain real literary recognition in England. His own whimsical but keen explanation of his foreign reception is as follows: "It has been a matter of marvel, to my European readers, that a man from the wilds of America should express himself in tolerable English. I was looked upon as something new and strange in literature; a kind of demi-savage, with a feather in his hand instead of on his head; and there was a curiosity to hear what such a being had to say about civilized society." By another than the modest author, however, his success may well be attributed to the geniality of his nature, his social gifts, and his literary feeling. He was able to please an audience schooled in the manner of Addison, Johnson, and Goldsmith, and at the same time to cause no offense to the patriotic sensibilities of his countrymen. Much of his work deals directly with English life and customs and is written in the manner of a kindly, well-bred Englishman. The influence of Irving upon American letters was hence, in the main, good; it enabled writers to make use of the best English tradition and helped to rid them of the provincialism which had characterized their work up to his coming. He is perhaps best as an essayist, and he will be permanent for his charm and refinement; yet it must not be forgotten that he was practically the discoverer, for Americans at least, of the effectiveness of the short story as a form of art. Nor is Irving's place in English literature unimportant, for he was a link between Goldsmith and Dickens. Indeed, Irving seems rather like an English than like an American author; for, though there is a quaintness in his humor and freshness in his views, he is devoted to English traditions as to form. With Whitman, Bret Harte, and Mark Twain one encounters a more obviously American school.

Bibliography. A fair amount of commentary on Irving exists. In addition to the biography by his nephew, P. M. Irving, *Life and Letters* (3 vols., New York, 1909), there are: W. C. Bryant, *Discourse on the Life, Character, and Genius of Washington Irving* (New York, 1860); H. W. Longfellow, *Address before the Massachusetts Historical Society* (Boston, 1870); Laun, *Washington Irving: Ein Lebens- und Charakterbild* (Berlin, 1870); C. D. Warner, *Life*, in the "American Men of Letters Series" (Boston, 1884). Critical discussions of his work are to be found in the literary histories, such as Beers, *Initial Studies in American Letters* (New York, 1892); Barrett Wendell, *A Literary History of America* (ib., 1900); H. W. Mabie, *Backgrounds of Literature* (ib., 1904); id., *Writers of Knickerbocker* (ib., 1912).

IRVING, WILLIAM (1766–1821). An American author, brother of Washington Irving, born in New York City. He was engaged in fur trading with the Indians in the region of the Mohawk River from 1787 to 1791 and in 1793 established his business in New York City and married a sister of James K. Paulding, one of his brother's collaborators in *Salmagundi*. He was a popular member of the literary coterie which flourished in New York early in the last century; and his many poems and contributions to *Salmagundi* mark him as among the best of early American humorists. From 1814 to 1819 he was a Democratic member of Congress.

IR′VINGITES. See CATHOLIC APOSTOLIC CHURCH.

IR′VINGTON. A town in Essex Co., N. J., adjoining Newark, of which it is a residential suburb, on the Lehigh Valley Railroad (Map: New Jersey, D 2). It has smelters, foundries, automobile works, lumber yards, refineries, a tannery, and manufactories of linoleum, machinery, masons' materials, and novelties. The city contains the Gladden Lodge Hospital, Bethany Home, Elks Home, a large public park, and a fine town hall. The commission form of government was adopted in 1914. Settled as early as 1666, Irvington was called Camptown until 1852, when it received its present name. It was incorporated in 1898. Pop., 1900, 5255; 1910, 11,877; 1914 (U. S. est.), 14,697.

IRVINGTON. A village in Westchester Co., N. Y., on the Hudson River, 23 miles north of New York City, on the New York Central and Hudson River Railroad. It is a beautiful place of residence. Prominent among its features of interest are the fine town hall with the Guiteau Library, and "Sunnyside," the home of Washington Irving. The waterworks are owned by the village. Pop., 1900, 2231; 1910, 2319.

IRWIN, ẽr′win. A borough in Westmoreland Co., Pa., 22 miles southeast of Pittsburgh, on the Pennsylvania Railroad (Map: Pennsylvania, B 6). Some of the most extensive bituminous coal mines in the State are located here, and there are also iron foundries, flour mills, car shops, facing and planing mills, electrical goods and mirror factories, etc. Pop., 1900, 2452; 1910, 2886.

IRWIN, ẽr′win, JOHN (1832–1901). An American naval officer, born in Pennsylvania. He entered the Naval Academy in 1847 and became passed midshipman in 1853. He served on the frigate *Wabash* in the Civil War and took part in the battle of Port Royal, S. C. Irwin also participated in the engagements at the forts at Hatteras Inlet and Forts Walker and Beauregard. At the capture of Fort Pulaski he received special mention in the report of the battle sent to the Navy Department. During his career he was advanced through the various ranks of the service until, in 1891, he was made a rear admiral. He retired April 15, 1894.

IRWIN, MAY (1862–). An American actress, best known in farce comedy. She was born at Whitby, Ontario, Canada, and made her appearance on the stage at Buffalo early in 1876. Coming to New York, she played for several years at Tony Pastor's Theatre; then became a member of Daly's company, with which she remained until 1887. She appeared as a star in *The Widow Jones; Kate Kip, Buyer; Mrs. Peckham's Carouse; Getting a Polish; Widow by Proxy* (1912); *The Crimson Rambler* (1914); *No. 13 Washington Square* (1915); and other light pieces. Consult L. C. Strang, *Famous Actresses of the Day in America* (New York, 1900), and Norman Hapgood, *The Stage in America, 1897–1900* (ib., 1901).

IRWIN, WALLACE (ADMAH) (1875–).

An American journalist and author, brother of Will Irwin, born at Oneida, N. Y. He graduated from the Denver High School in 1895 and studied at Stanford University (1896–99). He was special writer for the San Francisco *Examiner* in 1900, served as editor of the San Francisco *News Letter* in 1901 and of the *Overland Monthly* in 1902, wrote burlesque for the Republic Theatre in 1903 and topical verse for the New York *Globe* in 1904–05, and was staff member of *Collier's Weekly* in 1906–07. Besides his magazine articles, he is author of *The Love Sonnets of a Hoodlum* (1902); *The Rubaiyat of Omar Khayyam, Jr.* (1902); *Fairy Tales up to Now* (1904); *Nautical Lays of a Landsman* (1904); *At the Sign of the Dollar* (1904); *Chinatown Ballads* (1905); *Random Rhymes and Odd Numbers* (1906); *Letters of a Japanese Schoolboy* (1909); *Mr. Togo, Maid of All Work* (1913); *Hashimura Togo, Domestic Scientist* (1914).

IRWIN, WILL(IAM HENRY) (1873–). An American journalist and author, brother of Wallace Irwin, born at Oneida, N. Y. He graduated from Stanford University in 1899. He served as assistant editor (1899) and editor (1900) of the San Francisco *Wave*, as reporter (1901), special writer (1902), and Sunday editor (1902–04) of the San Francisco *Chronicle*, as reporter of the New York *Sun* (1904–06), as managing editor of *McClure's Magazine* (1906–07), and as writer for *Collier's Magazine* (1907–08). Thereafter he devoted himself to general magazine writing. He is author of *Stanford Stories* (1900), with C. K. Field; *The Reign of Queen Isyl* (1903) and *The Picaroons* (1903), with Gelett Burgess; *The Hamadryads* (1904), verse; *The City that Was* (1907); *Old Chinatown* (1908, 1913); *The Confessions of a Con Man* (1909); *Warrior the Untamed* (1909); *The House of Mystery* (1910); *The Readjustment* (1910); *The Red Button* (1912); *Where the Heart is* (1912); *Beating Back* (1914), with Al J. Jennings.

IS. See HIT.

ISAAC, ī'zak (Heb. *Yiṣḥāk*, from *ṣāḥạk*, to laugh). One of the Hebrew patriarchs. The story of Isaac is given in Gen. xviii–xxxv. He was the son of Abraham and Sarah, born to them when Abraham was 100 and Sarah 90 years old. The connection of the name with the root "to laugh" is explained in three different versions. When the birth of Isaac is foretold by the angels, *Sarah* is reported to have laughed (Gen. xviii. 12); another account says it was *Abraham* who laughed (Gen. xvii. 17–19); the third says *every one who heard of it* would laugh (Gen. xxi. 6). When the child was eight days old, he was circumcised (Gen. xxi. 4), and as he grew older he was a good deal with Ishmael, his half brother. This displeased Sarah, and she had Hagar and her son driven forth (Gen. xxi. 9 et seq.). The next that we hear of Isaac is in the episode of the offering (Gen. xxii). In obedience to divine prompting, Abraham set out with his son for Mount Moriah (q.v.) and there attempted to sacrifice the lad as a burnt offering. An angel interposed, and a ram was substituted. After the death of his mother Isaac married Rebekah, his kinswoman, brought by Eliezer, the servant of Abraham, by his master's command from Mesopotamia (Gen. xxiv). Isaac was then 40 years of age. After 20 years two sons were born, Esau and Jacob. The sons were different in character, with the result that Isaac loved Esau better, while Rebekah loved Jacob (Gen. xxv. 21–34). When a famine came upon the land of Canaan, Isaac was warned of God not to go down to Egypt, but to go to Abimelech, King of Gerar. Here he practiced the same deceit as his father before him, saying that his wife was really his sister. He prospered greatly in the land and excited the envy of the inhabitants, who twice took away the wells that he had digged. A third well was left unmolested, and he called it Beersheba (Gen. xxvi). In his old age Isaac became blind and, fearing that he was soon going to die, was anxious to bless his favorite son, Esau. By dressing in hairy garments Jacob was able to deceive his father and received the blessing intended for his brother. In consequence of this Jacob had to leave home, but not before he had received a second blessing from his father (Gen. xxvii). Isaac lived 180 years, long enough to see his son deceived by his children when they sold their brother Joseph. He was buried by Jacob and Esau in the cave of Machpelah (Gen. xxxv. 29; xlix. 31).

It is the opinion of many scholars at the present time that Isaac is either a tribal name or the name of the numen, or local divinity, of Beersheba. The theory is plausible that the full name was once Yishak-El, i.e., 'El (or god) laughs.' There is no evidence as yet, however, of a tribe bearing this name, and though the scornfully laughing (cf. Ps. ii. 4) or benignantly smiling El would not be an impossible designation of a local deity, no evidence has yet been forthcoming of the worship of a god by that name. Isaac is more especially associated with Beersheba, as Abraham is with Hebron, and Jacob with Bethel (see NEGEB); and whatever light may in the future be shed on the other two patriarchs by contemporaneous records is likely to affect also the judgment as to the character of Isaac.

Scholars who accept the composite character of the present Book of Genesis believe that the Isaac narrative contains: (*a*) specimens of Hebrew folklore, as the story of Isaac's birth, and the play upon his name, "the laughter"; (*b*) illustrations of a religious doctrine, as in the story of the sacrifice, showing the proper attitude of the Yahwe worshiper, which is also found in the Pentateuchal codes, to human sacrifice; (*c*) traditions of the wanderings of some of the Hebrew tribes during the nomadic period.

In the accounts of Isaac's birth there is a tendency on the part of scholars to see an attempt to modify tradition so as to make it appear that Isaac is the legitimate and "only" son of Abraham. The claims of Ishmael (q.v.), who is the older, cannot be altogether set aside; but the distinctively Jewish point of view is brought out, not only by making Isaac the offspring of Sarah—the true wife of Abraham—but by the elaborate account of the promise made to Abraham that he should have a son by Sarah, despite the latter's great age, and by the emphasis laid upon the joy that Isaac's coming occasioned on all sides. The setting aside of Ishmael to make room for Isaac reflects the separation of the Ishmaelite clan or clans from Israel and Judah. Ishmael not having formed an element in the Hebrew confederacy, the very closeness of the bond between the two as preserved by tradition even among the Hebrews becomes the motive for transforming these traditions in such a manner as to present Ishmael in as unfavorable light as possible. Hence in the most important incident of the Isaac narrative, the journey of Abraham and Isaac to the place of sacrifice, Isaac is not only called the beloved but the only son of Abraham, with the evident intent of ignoring Ishmael altogether. The story of Isaac's sacrifice may be a genuine Jewish midrash, not based at all upon popular tradition, but deliberately introduced as a *mashal* (or allegory) to illustrate Abraham's implicit obedience to Yahwe. Abraham in this story is the type of the true and pious Yahwe worshiper who is willing to sacrifice, at divine command, even that which is dearest to him. But the point of the story is that, precious as this unflinching devotion is to the God of Israel, he is ready to accept an animal sacrifice as a substitute for human sacrifice. Similarly the commandment, "The first-born of thy sons shalt thou give unto me; likewise shalt thou do with thine oxen and with thy sheep" (Ex. xxii. 29 et seq.), the original significance of which can be subject to no question, was subsequently modified by permitting a ransom in the case of the human sacrifices. In view of the persistence of such sacrifices among some of the other Semitic nations, this sign of social progress, reflected both in story and legislation, is significant.

When we come to the wanderings of Isaac from Rehoboth to Gerar and from Gerar to Beersheba, and the quarrels over the wells, we seem to be again in the presence of popular traditions regarding the nomadic period, to which, however, a religious turn has been given by the compilers of the tradition in making Isaac a type of the mild and peace-loving Israelite; and once more the artificial (though also artistic) character of the Isaac narrative appears to some scholars to be revealed in making Isaac die at Mamre-Hebron (Gen. xxxv. 27), in order to locate his burial place in the cave of Machpelah with Abraham, whereas Isaac's real home is Beersheba. As for the stories of Isaac's relationship to his two sons, Esau and Jacob, they reflect again the rivalry between Edom and Israel. (See Jacob.) Consult the commentaries on Genesis. See Genesis, Book of.

ISAAC I COMNE'NUS (?–1061). Byzantine Emperor from 1057 to 1059. He was the first of the line of the Comneni to ascend the throne, though his family had been for some time prominent in both military and civil capacities. In 1057 he was proclaimed Emperor by the landed aristocracy in opposition to Michael VI, whom he defeated and deposed. On his accession he found the affairs of the Empire in a very bad condition—rebellion within, aggression without, and the treasury exhausted. He succeeded in establishing a system of great economy in all branches of the administration and, in order still further to lighten the burden of taxes on the people, called upon the clergy to contribute their share. But the clergy refused to endure the imposition of any such burdens, and the Patriarch Michael is reported to have even threatened him with deposition. Death delivered Isaac from this formidable opponent, and the clergy were compelled to submit. In 1059 he repelled the Hungarians, who had encroached upon his possessions in the northwest, but soon afterward he was attacked by a violent fever and, believing his death approaching, appointed his famous general, Constantine Ducas, as his successor. He recovered from his illness, but nevertheless resigned the crown and retired to a convent, where he died after two years. Isaac was not deficient in literary attainments. We still possess his *Scholia* on Homer, his favorite author; further, a work, *Characteristics*, dealing with the Greek and Trojan chiefs mentioned in Homer; and, finally, a treatise entitled *On the Works of Homer*. Consult Finlay, *History of Greece*, vols. ii, iii (Oxford, 1877).

ISAAC II ANGELUS (?–1204). Byzantine Emperor from 1185 to 1195 and 1203–04. Delivered by a popular revolution from death, to which he had been condemned by his kinsman, Adronicus Comnenus, Emperor of Constantinople, he obtained the throne in 1185. His vices, incapacity, and military disasters rendered him unpopular, and he was dethroned, blinded, and shut up in a monastery by his brother, Alexius III, in 1195, but was restored by the Crusaders, who took Constantinople in 1203, only to be again dethroned by Alexius Ducas in 1204. He died soon after. Bulgaria was lost to the Byzantine Empire during his first period of power in 1186. Consult Finlay, *History of Greece*, vol. iii (Oxford, 1877), and Pears, *Fall of Constantinople* (New York, 1886).

ISAAC OF ANTIOCH. A poet and theologian in the Syrian church. He was probably born at Edessa in the first part of the fifth century and seems to have moved to Antioch c.450 A.D. The Chronicle of Edessa refers to him as flourishing in 451–452; the Chronicle of Michael the Syrian makes him a contemporary of Nonus, who began his bishopric in 449, and he was still living in the days of the Patriarch Peter the Fuller (470–488) and the Emperor Zeno (474–491). He was for many years abbot of a convent near Antioch. Isaac was a Monophysite, and his teacher Zenobius was a disciple of Ephraem. Many of his poems are lost; and of the 191 metrical homilies that go by his name, some may have been written by an Isaac who flourished in the beginning of the fifth century and was a disciple of Ephraem or by another Isaac living in the days of Bishop Paul (510–522). The lost poems on the classical games in 404 and the destruction of Rome by Alaric in 410 may have been by the former of these. Isaac of Antioch no doubt wrote the famous poem of 2136 lines dealing with the parrot which uttered the Trisagion in the streets of Antioch. In his denunciations of current abuses, of corrupt judges, of oppression, luxury, and licentiousness, he resembles one of the Hebrew prophets. He alludes to the invasion of the White Huns. His homilies were written in a heptasyllabic metre, and his style is forceful and rich in imagery. Bickell published in two volumes 37 of the 191 poems given in his list (Giessen, 1873–77); and 67 poems, among them 43 new ones, were published by Bedjan, *Homiliæ S. Isaaci* (Paris, 1903). Consult Brockelmann, in *Die Literaturen des Ostens*, vii, 2 (Giessen, 1907). See Syriac Literature.

ISAACS, Rufus (Daniel). See Reading of Earley, first Baron.

ISAAK, ē′zäk, **IZAK,** or **YZAC,** Heinrich (c.1450–c.1517). A German-Italian musician. We know nothing of his life except that he was in the service of Lorenzo de' Medici for a number of years, was organist in Rome, and later was "symphonista regis" to Maximilian I at Vienna. He was a prolific composer of the contrapuntal school and was one of the first to employ the melody in the soprano. His compositions were frequently reprinted in collections, and some of his part songs and melodies (notably the choral "Nun ruhen alle Wälder") are still in use.

ISABELA, ĕ'sȧ-bä'lȧ. A province in Luzon, Philippines. It takes in part of the Sierra Madre and the Carballos Mountains and borders on the Pacific Ocean. The chief rivers are the Grande de Cagayán and the Magat (Map: Philippine Islands, C 2). A large part of its area is covered with thick forests peopled by savage tribes. Live stock is raised extensively, and palay, coffee, chocolate, corn, and vegetables are cultivated. Area, 5394 square miles; pop., 1903, 76,431. Capital, Ilagan (q.v.).

ISABELA. A town of Negros, Philippines, in the Province of Negros Occidental, 36 miles south of Bacólod. Pop., 1903, 12,836.

ISABELA ISLAND. See ALBEMARLE ISLAND.

ISABELINOS, ĕ'sȧ-bȧ-lē'nōs. In the first Carlist War, the party that opposed Don Carlos and supported the young Queen Isabella II. They were also known as Christinos or Cristinos (q.v.), from their support of Cristina, the Queen mother, in her defense of the rights of her daughter.

ISABELLA, ĭz'ȧ-bĕl'lȧ. A buff or brown color. The term originated in a story told of Isabella of Austria, daughter of Philip II, at the siege of Ostend (or of Isabella of Castile at the siege of Granada), who vowed not to change her linen before the capture of the town. Owing to the length of the siege, the linen was discolored and so gave rise to the name.

ISABELLA; OR, THE POT OF BASIL. A poem by Keats, based on a story by Boccaccio (1818).

ISABELLA I, Sp. **ISABEL,** ĕ'sȧ-bĕl' (1451-1504). Queen of Castile, known as the Catholic. She was born at Madrigal, Old Castile, the daughter of John II, King of Castile and León, by his second wife, the Infanta Isabella of Portugal. In 1454 Isabella's brother Henry ascended the throne of Castile, and in 1469 the Princess, after considerable opposition and in the face of great difficulties, married Ferdinand of Aragon. On the death of Henry IV, in 1474, Isabella and Ferdinand, jointly, succeeded to the throne of Castile and León, to the exclusion of her niece Joanna. She had won the support of a great part of the estates of the kingdom during her brother's life, and the victorious arms of her husband compelled the consent of the rest. A war with Portugal, which was waged by King Alfonso in behalf of the Princess Joanna, was terminated in Isabella's favor in 1479, and the same year Ferdinand succeeded to the throne of Aragon as Ferdinand V. This union of the two chief Spanish kingdoms laid the foundation of Spain's future greatness. The first task the allied sovereigns set themselves to perform was the pacification and consolidation of the kingdoms of Castile and Aragon. Then in 1482 they began the 10 years' war against the Moors of Granada, which culminated with the capture of the Moorish capital and the extinction of Moorish sovereignty in Spain at the beginning of 1492. It was towards the end of this struggle, the danger and hardships of which Isabella shared with her army, that the Queen of Castile earned her greatest title to fame in the eyes of posterity, by her acquiescence in the plans of Columbus, who was then a suppliant at the Spanish court. For their successes against the Moors and their stanch Catholicism the title of "Catholic sovereigns" was conferred by the Pope on Ferdinand and Isabella. Queen Isabella was possessed of no inconsiderable beauty and much winning grace, although proud, ambitious, and exceedingly punctilious. She was always present in meetings of the council, and insisted on the use of her name with that of Ferdinand in all public documents. The consolidation of the Spanish Kingdom through the organization of the Hermandad (q.v.) and the establishment of the royal supremacy over the great military orders were in a large measure her work. In the reign of Isabella the Inquisition was organized in Castile by Torquemada, under whom its work was carried on with a barbarity bred of the most fanatical zeal. In 1492 the Jews were expelled from Castile and the rest of Spain, to the great detriment of the country. She died at Medina del Campo on Nov. 26, 1504, and was buried in accordance with her own wishes in the Franciscan monastery at Granada, whence her remains and those of Ferdinand were removed to the royal chapel of the cathedral in 1521. Of her five children, the two eldest, Isabella, Queen of Portugal, and John, her only son, died in 1498 and 1497 respectively. Of her three remaining daughters, Joanna the Mad became the wife of Philip of Austria and the mother of Charles V of Germany; Maria married Emmanuel of Portugal; and Catharine of Aragon was the unfortunate first wife of Henry VIII of England and the mother of Mary Tudor.

Bibliography. H. del Pulgar, *Crónica del reinado de los Reyes Católicos* (Valencia, 1780); Prescott, *History of the Reign of Ferdinand and Isabella the Catholic, 1479-1516* (London, 1889), the best general work containing full biographical notes; Clemensin, "Elogio de Isabel," in vol. vi of the *Memorias de la Academia de la Historia,* with biography and letters of Queen Isabella (Madrid, 1820); Nervo, *Isabella la Catholique, reine d'Espagne, sa vie, son temps, son règne, 1451-1504* (Paris, 1884); J. H. Mariejol, *L'Espagne sous Ferdinand et Isabelle* (ib., 1892); O. O. Howard, *Isabella of Castile* (New York, 1894); G. Sela, *Politica internacional de los reyes católicos* (Madrid, 1905); M. A. S. Hume, *Queens of Old Spain* (New York, 1906); C. Hare, *Queen of Queens and the Making of Spain* (ib., 1906); also consult works cited under SPAIN and CASTILE.

ISABELLA II (1830-1904). Queen of Spain from 1833 to 1868. She was the daughter of Ferdinand VII by his fourth wife, Maria Christina of the Two Sicilies, and was born at Madrid, Oct. 10, 1830. By a decree which set aside the Salic Law in Spain and which was confirmed by the Cortes, March 29, 1830, the Infanta Isabella became the heiress apparent to the throne, which she ascended on the death of her father in September, 1833, her mother being appointed Queen Regent. An insurrection in favor of her uncle, Don Carlos (q.v.), who according to the Salic Law would have succeeded to the throne on the death of his brother, immediately broke out and raged with great violence until 1840, when the cause of the court triumphed. In the course of the period politicians had begun to divide into the two parties of the *Moderados,* or Conservatives, and the *Exaltados,* or Liberals;

and the Queen Regent found it necessary to enlarge the Liberal constitution in 1834 and ultimately (1836) to reëstablish the constitution of 1812. In 1840 Maria Christina, after making Espartero, the champion of the court in the war over the succession, Prime Minister, was reduced to the necessity of resigning the regency, which was conferred on Espartero. An insurrection broke out in 1843, which led to the overthrow of the Regent Espartero and the establishment of the military dictatorship of Narváez, who introduced an anti-Liberal policy. On Nov. 8, 1843, Queen Isabella was declared by the Cortes to have attained her majority. Although the young Queen enjoyed personal popularity, political intrigues continued, with frequent attempts at insurrection. In 1846 the Queen married her cousin, Don Francisco d'Assisi, elder son of Ferdinand VII's youngest brother. A change to almost purely absolute government in 1853 was followed by the banishment of many chiefs of the Constitutional party, as a result of which a formidable rising of the army took place in 1854 under O'Donnell (q.v.). Espartero was put at the head of an administration in which Liberal principles held sway. But the Queen disapproved of his policy, and he resigned in favor of O'Donnell, July 14, 1856, who was soon after supplanted by Narváez. For a number of years the chief power was held alternately by these two ministers. Though Liberal ministers were more than once forced upon her, the Queen, as time went on, fell more completely under the influence of the reactionary faction. She lost much of her former popularity, and the nation became impatient under her arbitrary rule. In September, 1868, a revolution broke out, headed by Serrano, Prim, and Topete, ending in the formation of a Republican provisional government and the flight of Isabella to France. In 1870 she abdicated in favor of her son, Alfonso XII, who succeeded to the throne in 1875 after the brief reign of Amadeo of Savoy and the failure of the Republic under Castelar. After 1871 the ex-Queen of Spain passed the greater part of her time in Paris. See Spain.

Bibliography. F. H. Gribble, "Isabella," in *Fortnightly Review*, vol. xcix (London, 1904); C. Cambronero, *Isabel II intima* (Barcelona, 1908); R. Challice, *Secret History of the Court of Spain, 1802–1906* (New York, 1909); E. B. D'Auvergne, *Queen at Bay* (ib., 1910), an account of the Carlist War, 1833–40; F. H. Gribble, *The Tragedy of Isabella II* (Boston, 1913).

ISABELLA, ISABEAU, or ELIZABETH, OF BAVARIA (1370–1435). Queen of France. The daughter of Stephen II of Bavaria, and at 15 the wife of Charles VI of France, she was crowned Queen in 1389 and bore several children. She was noted for her remarkable beauty, and for a few years all went well; but in 1392 Charles began to have periods of insanity. He showed a great dislike for Isabella, whom he had loved madly, and a great partiality for a mistress. Isabella became very intimate with the Duke of Orléans, the King's brother, who was suspected of being the father of Isabella's seven children born between 1393 and 1407, the year of the Duke's assassination. Although frequently acting as Regent, Isabella led a scandalous life and joined first one political party, then another. She was imprisoned for a few months, but was freed by John the Fearless, after whose murder she joined in surrendering France to England, in 1420, by the Treaty of Troyes. Her daughter Catharine she married to Henry V of England, and she had her share in the English triumphs; but she was heartily despised by the French. After the death of Charles VI, in 1422, she lived a lonely life at Paris, having grown very stout and become an object of general contempt. Consult: Vallet de Viriville, *Isabeau de Bavière* (Paris, 1859); Lavisse, *Histoire de France*, vol. iv (ib., 1902); Thibault, *Isabeau de Bavière* (ib., 1903).

ISABELLA OF BRAZIL (Portug. Isabel), Countess d'Eu (1846–). A princess of Brazil, born in Rio Janeiro, the daughter of Emperor Dom Pedro II. Because of her brother's early death, she was the heir apparent during the long reign of her father. In 1864 she married Gaston d'Orléans, Count d'Eu, and in 1886 was left as Regent, with full powers, during her father's absence on a visit to Europe. An ardent opponent of slavery, and intolerant of the process of gradual abolition which was being carried out, she determined to end the institution at once. Accordingly she had her Minister introduce into the Chamber of Deputies a law for immediate emancipation without compensation, and on May 15, 1888, she issued the decree putting the law into effect and freeing forever all the slaves in Brazil. This measure caused the large planters to join with the Republicans in their opposition to the monarchy. Further, Isabella and her husband were decidedly unpopular and were thought to be under the dominance of the clergy and desirous of maintaining an autocratic rule. These conditions precipitated the revolution which overthrew the Empire and drove Isabella, her father, and the Imperial family into exile (Nov. 15, 1889). By an arrangement between the head of the French royal house and the Count d'Eu, the descendants of the Count and Countess d'Eu form an independent ex-ruling house, bearing the title Orléans-Braganza.

ISABELLA OF ENGLAND. See Edward II; Edward III.

ISABELLA THE CATHOLIC, Order of. A Spanish order of knighthood, founded by Ferdinand VII, in 1815, as a reward for loyalty in the defense of Spanish-American possessions. It is now conferred for all kinds of merit. The sovereign is the head of the order, which is divided into four classes of grand cross, commanders of the first and of the second rank, and knights. The badge of the order is an eight-pointed cross of gold inlaid with red enamel, bearing a central plaque with the motto "A la lealtad acrisolada" (to proven loyalty), and suspended from a laurel crown which is held by a ribbon of orange and white.

ISABELLE (ĕ'zȧ'bĕl') **GAZELLE.** A gazelle of Kordofan and Sennar (*Gazella isabella*), also known as Genai, distinguished from the dorcas mainly by the sharp inward bend of the horn tips, which form decided hooks. See Plate of Gazelles.

ISABELLITA, ĕ'sȧ-bĕl-lē'tȧ (Sp., little Isabelle). A name in the Spanish West Indies for any of the gaudy fishes of the genus *Angelichthys*, called also angel fish and emperor fish (q.v.).

ISABEY, ĕ'zȧ'bā', Jean Baptiste (1767–1855). A French painter of portraits in miniature. He was born at Nancy, where he painted miniatures of the neighbors and studied with Claudot. Arriving in Paris at the age of 18, he was coldly received by his compatriot of Lorraine, Dumont, the Queen's miniature painter. To pay his expenses, he painted buttons at 12 sous each and medallion copies of Vanloo and Boucher. Fortunately, through his roommate's father, who worked at Versailles for the tutor of the royal children, he received the commission to paint for the Queen, Marie Antoinette, miniatures of her two nephews, sons of the Comte d'Artois, who afterward reigned as Charles X. This made Isabey's fortune. The Queen liked his work, and he painted a miniature of her, after a portrait by Sicardé. He then studied with David and after the Reign of Terror became professor of drawing in a school attended by Hortense Beauharnais, who introduced him to Josephine. He was the intimate friend of both Bonaparte and Josephine and in 1805 was named First Painter to the Empress, with the additional duty of organizing the court fêtes and superintending the decorations of the Opéra. After the fall of Napoleon, Isabey stood in high favor at the courts of Louis XVIII, Charles X, and Louis Philippe, and became Commander of the Legion of Honor and Director of Fêtes under Napoleon III. He exhibited regularly at the Salon from 1793 to 1841 and during his long career painted likenesses of almost all the eminent persons of France. In the Morgan collection of miniatures loaned to the Metropolitan Museum, New York, are 13 portraits by Isabey, among them "The Duke of Reichstadt," "Queen Hortense and her Son," and "Madame Récamier." His drawing is of distinguished excellence, and his work displays to a remarkable degree the possibilities of miniature painting. Consult: Edmond Taigny, *Isabey, sa vie et ses œuvres* (Paris, 1858), containing important extracts from his diary; Williamson, *Catalogue of the Miniatures of J. Pierpont Morgan* (London, 1908); Basili-Callemaki, *J. B. Isabey* (Paris, 1909), richly illustrated and exhaustive.

ISABEY, ē′zȧ′bā′, LOUIS GABRIEL EUGÈNE 1803–86). A French genre and marine painter. He was born in Paris, the son and pupil of Jean Baptiste Isabey (q.v.), through whose influence he was made painter of the Algerian expedition of 1830. He became Chevalier of the Legion of Honor in 1832, Officer in 1852. He continued to exhibit until 1878, and towards the end of his life worked much in water colors. His works include: "Harbor of Honfleur" (1827); "Battle of the Texel" (1839), Versailles Museum; "View of Boulogne Harbor" (1843), Toulouse Museum; "Ceremony in the Church of Delft" (1847); "Marriage of Henry IV" (1848); "Embarkation of De Ruyter and De Witt" (1850) and "Roadstead of Saint-Malo," in the Luxembourg Museum; and others in the provincial museums of France and Germany. The Metropolitan Museum of New York possesses his "Banquet Hall" (1873). He was much influenced in color by Delacroix, although his art is of a lighter character. His genre pictures represent scenes of a past age and are painted in delicate and harmonious colors, especially the costumes. His marines show in an admirable manner the glittering evanescent effects of light upon the waves.

ISABNORMAL (īs′ăb-nôr′mal) **LINES** (from Gk. *ἴσος, isos*, equal + Eng. *abnormal*, from Lat. *abnormis*, abnormal, from *ab*, from + *norma*, rule). Lines connecting places whose temperature, pressure, etc., for any epoch have equal departures from the normal values of the respective places.

ISÆ′US (Lat., from Gk. *Ἰσαῖος, Isaios*) (c.420–350 B.C.). A Greek orator included in the Alexandrian canon of the 10 Attic orators. Of his life little is known. He was the son of Diagoras and was probably born at Chalcis, although most of his life was spent at Athens, where he was a contemporary of Isocrates (q.v.), whose pupil he is said to have been. As he was not an Athenian citizen, he could not plead before the courts, but, like Lysias, he took up the profession of logographer, or writer of speeches for others. His specialty was the laws of inheritance. Ancient traditions say that Demosthenes was a pupil of Isæus. The ancients had 64 speeches which were attributed to him, of which 50 were held to be genuine. Of these only 10 have come down to us complete, although the single manuscript which contains them has preserved about half of another speech, and Dionysius of Halicarnassus (q.v.) has a long fragment, which is usually printed as a twelfth oration. Isæus' strength is said by Dionysius to have depended on his skill in forensic controversy. In the development of Athenian oratory he marks the transition from Lysias (q.v.) to Demosthenes (q.v.). The speeches are best edited by Bürmann (Berlin, 1883). There is an English translation by Jones, *The Speeches of Isæus* (London, 1779). Consult: Jebb, *The Attic Orators*, vol. ii (London, 1876); Blass, *Die attische Beredsamkeit*, part ii (Leipzig, 1892); Wyse, *The Speeches of Isæus* (Cambridge, 1904); Christ-Schmid, *Geschichte der griechischen Litteratur*, vol. i (5th ed., Munich, 1908). See CANON ALEXANDRINUS; LOGOGRAPHERS.

ISAG′ORAS (Lat., from Gk. *Ἰσαγόρας*) (c.545–c.500 B.C.). An Athenian politician. He was chosen first archon (508 B.C.) after the expulsion of Hippias (510), although Clisthenes (q.v.) had been much more influential at the time. In the quarrel which followed Isagoras was opposed by Clisthenes and the entire people, and the new constitution was victorious. But Isagoras appealed to Sparta, and Cleomenes I (q.v.), King of Sparta, insisted that Clisthenes be surrendered, since he was descended from the accursed Alcmæonidæ (q.v.). The leader of the people voluntarily retired; the Spartans occupied the city; Isagoras banished 700 families and attempted to replace the democratic Five Hundred by an aristocratic Three Hundred. At this the people rose, hemmed the Spartans within the Acropolis, and after three days permitted them and Isagoras with them to retire to Sparta, but executed all Athenian partisans of Isagoras, who himself died in exile.

ISAIAH, ī-zā′yȧ *or* ī-zī′yȧ (Heb. *Yesha'ayāhū*, help of Yahwe, or Yahwe helps). One of the most famous of the older Hebrew prophets. He was the son of Amoz and lived at Jerusalem during the reigns of Uzziah, Jotham, Ahaz, and Hezekiah. We may assume that he was born about 760 B.C., that he began to prophesy in the year in which Uzziah died (c.737 B.C.), and that he died about 700 B.C. He appears to have occupied a high social position, had easy access to Ahaz, and exerted much influence on Hezekiah. Beyond this we know little of his private life. It appears from his discourses that he was married and had at least two children, to whom (like Hosea, q.v.) he assigned symbolic names, Shear-jashub and Maher-shalal-hash-baz (vii. 3; viii. 3). It is the opinion of modern scholars that but few of the discourses in the Book of Isaiah (see ISAIAH, BOOK OF) emanate from Isaiah himself, and that it is doubtful whether any one of these discourses has been preserved in its original form. They are found in the first part of the book, contain additions belonging to various later periods, and have been so radically rearranged that it is exceedingly difficult to fix the chronological order and to determine the political events to which they have reference. Still some of the discourses are quite clear.

The most important event in the reign of Ahaz was the combination of Pekah, King of Israel, and Rezin of Damascus against Judah (2 Kings xvi). To this event (which occurred in 734 B.C.) and its consequences several discourses of Isaiah refer, found in chaps. vii, viii, and xvii. The prophet advises Ahaz to be calm and to place his trust in Yahwe. As a matter of fact, the combination against Judah failed, but not until Ahaz had called for aid upon Tiglath-pileser IV, the King of Assyria (745–728 B.C.). This act arouses the prophet's ire. He changes his tone towards Ahaz, denounces his lack of confidence in Yahwe, and predicts havoc and misfortune to the country from these very Assyrians whom Ahaz has called in as allies. The result was that the northern kingdom of Israel was partly taken in 732 B.C. and finally conquered by the Assyrians in 723 B.C. (see SAMARIA), and incorporated in the Empire as a province, while Judah escaped only by becoming a vassal to the King of Assyria. In the days of Hezekiah the country chafed under the yoke, and a party arose in Jerusalem which formed an alliance with Egypt as a means of freeing the country from Assyrian suzerainty. Isaiah was equally opposed to this policy. Portions of his discourses during this period are preserved in chaps. xxviii–xxxi. He declares that the Egyptians and their allies will be defeated and goes so far as to intimate that Yahwe Himself will fight on the side of Assyria against His own people if they ally themselves with Egypt. Isaiah could not quell the warlike spirit which was rife in Judah, and the King watched for every chance to oppose Assyria. He not only joined with Egypt, but actually organized a revolt against Sennacherib (see HEZEKIAH), which terminated disastrously for the Judæan Kingdom, although by a fortunate turn of events it escaped being entirely wiped out. At this juncture the leading thought in what may be called Isaiah's theology reveals itself. The terrified ruler and his people in their distress hoped that by entreaties and sacrifices they might again secure the favor of Yahwe, for the calamity that befell the country was looked upon as a sign of Yahwe's displeasure. The first chapter of Isaiah (verses 5–26) gives the prophet's view of the situation. There is only one hope of salvation, and that is by a complete change of conduct on the part of the people, by upright practices, and by fair dealings, by honest government and just courts. As for sacrifices, prayers, and festivals, Yahwe hates them. This and other chapters afford an insight into the social conditions prevailing in the days of Isaiah, which is most important for understanding the attitude of the prophet towards political events. He felt deeply that there was no hope for Judah unless by a total change of conduct the people might secure once more the favor of Yahwe. Political alliances were of no avail, either with Assyria or with Egypt. He had warned Ahaz, but the warning was not heeded. His influence over Hezekiah was greater. Largely, no doubt, at his instigation, the King undertook some religious reforms. (See HEZEKIAH.) But Hezekiah, like Ahaz, yielded to pressure and put his trust in princes instead of in Yahwe. Isaiah, no doubt sorely disappointed, lost all hope and became a prophet who foresaw only gloom and woe for his people, declaring that none, whether great or small, would escape the punishment deserved by their shortcomings.

Hence, despite the obscurity in which the personality of the great prophet is enveloped through editorial interference with his productions, enough can be determined to enable us to grasp his essential message in its full force. His contention is that through right conduct alone can a people be saved. It is because of the profound impression that this message made —not, indeed, upon his own age, but upon later generations—that Isaiah became a type of the true prophet of Yahwe and that discourses of various periods which seemed worthy to be associated with Isaiah were grouped with his utterances, and a composite Book of Isaiah was gradually evolved.

ISAIAH, BOOK OF. The first of the so-called major prophets in the English version of the Old Testament and in all other translations. In the printed Hebrew Bibles and many manuscripts, including the *Codex Petropolitanus*, it also precedes Jeremiah and Ezekiel. But the order given in the Babylonian Talmud (*Baba bathra* 14 b) is Jeremiah, Ezekiel, Isaiah, and according to Elias Levita this was followed by the German and French Jews in their manuscripts. For this arrangement the Talmud assigns as a reason that "the Book of Kings ends in desolation, Jeremiah is all desolation, Ezekiel begins with desolation and ends with consolation, and Isaiah is all consolation." The significance of this order and the reason for it have been fully discussed by Schmidt (*The New World*, ix, 656 ff., Boston, 1900). Before larger books were made, while each prophet was copied on a separate scroll, as still was the case in the first century A.D. (Luke iv. 17), it is not probable that the question of precedence was seriously considered. When it was raised, the arrangement was, no doubt, determined by the same practical considerations of the effect upon readers and listeners in the synagogues that may be observed in the inner economy of each book, where words of comfort are apt to follow severe rebuke, and cheerful predictions denunciations of doom. The impression that the Book of Isaiah is "all consolation" was the result of the manner in which it was edited.

There is much evidence of editorial activity. Certain divisions are indicated by headings, either ascribing a section to Isaiah or describing its contents, or both. Thus, the prophecy beginning ii. 2 is introduced as "The word that Isaiah, the son of Amoz, saw concerning Judah and Jerusalem"; the narrative of the prophet's call, chap. vi, is dated "in the year when King Uzziah died"; the episode described in chap. vii is said to have occurred "in the days of Ahaz"; chaps. xiii–xiv are designated as "The Oracle concerning Babylon which Isaiah, the son of Amoz, saw"; chaps. xv–xvi are only called "The Oracle concerning Moab"; chap. xvii is called "The Oracle concerning Damascus"; chap. xix is designated as "The Oracle concerning Egypt"; chap. xx is dated in the year when "Tartan came against Ashdod, when Sargon, King of Assyria, sent him"; xxi. 1–10 is called "The

Oracle of the Wilderness," 11–12 "The Oracle concerning Duma," 13–17 "The Oracle concerning Arabia," xxii. 1–14 "The Oracle concerning the Valley of Vision" (perhaps Hinnom); chap. xxiii is said to be "The Oracle against Tyre" (probably Sidon); and i. 1 has the appearance of having been originally the heading of chap. i before it was expanded into a superscription to a larger collection of oracles. It is noticeable that headings ascribing particular sections to Isaiah and indicating the occasion are, with the exception of chap. xx, found only in chaps. i–xii; that the term *massa* (oracle) is limited to chaps. xiii–xxiii, where it is of frequent occurrence; that in these chapters the author's name is not added except in xiii. 1; and that there are no headings of any kind in chaps. xl–lxvi. The absence of any superscription in xl. 1 is all the more striking as the last 27 chapters are separated from the earlier collection of prophecies by four historic chapters (xxxvi–xxxix), which likewise have no special heading. It is also to be observed that in chaps. vii and xx, as well as in xxxvi ff., Isaiah is spoken of in the third person, while in chap. viii he speaks in the first person. A peculiarity that challenges attention is the appearance of more or less extensive sections, distinct in character, often strangely contrasting by their cheerful and comforting nature with what precedes them and yet without any special heading or ascription in any form to Isaiah. It is therefore natural to infer that the first collection of prophecies specifically assigned to Isaiah and to some definite occasion in his career has been preserved in chaps. i–xii; that the majority, if not all, of the oracles in chaps. xiii–xxiii were anonymous; that some prophecies, like those in chaps. vii and xx, were drawn from a biography of the prophet; that a second collection of Isaianic prophecies was used in chaps. xxviii–xxxi; that chaps. xxxvi–xxxix, which, with slight exceptions, are also found in 2 Kings xviii. 13–xx. 19, were taken over from the Book of Kings, or a common source; that large portions of the book were left by the final editor without any heading because they had none, among them such remarkable productions as chaps. xxiv–xxvii, xxxii–xxxv and xl–xlvi; and that the volume could not have been constituted by Isaiah himself in this manner.

Such facts did not fail to attract some degree of attention even in earlier times. Already Ibn Ezra (died 1167) hinted at later material in the book by his suggestion that it was Isaiah's in the same sense as the Book of Samuel was ascribed to this prophet. Grotius felt that many passages in Isaiah lx ff. showed that a situation in the Maccabæan period was in the prophet's mind, though he did not express any doubt as to the revelation of this situation to Isaiah; and the same attitude was apparently taken by Houbigant. Spinoza suggested that the Book of Isaiah was edited after the prophet's time. As long as it was supposed that all parts of the work must necessarily have come from Isaiah, the references to Cyrus in xliv. 28, xlv. 1, and the allusions to circumstances after the exile were explained as due to the prophetic gift which enabled Isaiah to place himself in any period in the future, even though it be separated by centuries from his own time, and to speak in view of the circumstances of that distant period. But the more clearly the historic situation was realized which is assumed to exist in many parts of the book, the more difficult it became to harmonize such a projection into the future, even if it was thought possible, with the practical religious aims of the prophets, and serious questions began to be raised whether this or that section may not have been added in later times. It was observed that the prophets, though their eyes were always turned to the future, seem to have proclaimed their oracles in view of present circumstances, and invariably appear to have had in mind the moral effect of their messages on the people they addressed, and it was asked what purpose Isaiah, who never threatened Judah with a Chaldæan invasion, could have had in comforting Zion with the return of Judæan exiles from Babylon and the rebuilding of the temple by Cyrus, whose name could have meant nothing to his hearers; how he could have hoped to be understood at all; and what the moral influence of such a change of tone, justified by nothing in the circumstances of his own time, would have been on the attitude of the people and the reception of his repeated denunciations of sin and prophecies of doom. Finally, the psychological difficulty of such a transfer to a definite point in the distant future, without any explanation of the circumstances leading up to it, began to be felt.

Especially Doederlein (1775), Koppe (1779), Eichhorn (1780), Justi (1793), Bauer (1794), Paulus (1793), Rosenmüller (1791–93), Bertholdt (1812), De Wette (1817), and Gesenius (1821) paved the way for a wider recognition of the composite character of the book. During the last century a very large number of scholars have endeavored to determine by internal evidence what prophecies are likely to have been uttered by Isaiah himself and when the assumed additions were made. It is now generally admitted that the following passages come from Isaiah, the son of Amoz: i; ii. 6–iv. 1; v. 1–23; vi; viii. 1–18; ix. 7–x. 4; x. 5–15; xvii. 1–11; xviii; xxii. 1–25; xxviii. 1–4; xxviii. 7–xxxi. In spite of the fact that Isaiah is spoken of in the third person, and that chap. vii especially offers great difficulties, the substance of chaps. vii and xx is also regarded by most scholars as coming from him. Concerning viii. 19–ix. 6 and x. 16–xi. 9 there is a marked difference of opinion: as they seem to presuppose the Babylonian exile and voice hopes centring around some descendant of the fallen Davidic dynasty, many scholars consider them as coming from a later period, while it is argued by others that Isaiah may have looked forward to the appearance of a stronger and nobler monarch of the reigning house after a time of great depression. The hymn of thanksgiving in chap. xii is generally held to be postexilic. In spite of the ascription to Isaiah, the magnificent poem in chaps. xiii–xiv reflects so clearly the situation at the end of the exile, when the overthrow of the last King of Babylon was expected, that those who do not regard the editorial heading as correct ascribe the section to this period. The same applies to the anonymous prophecies in chap. xxi. The date of chaps. xv–xvi can scarcely be determined. Psammetichus I (663–610 B.C.) is probably the "fierce king" of xix. 4; and in view of the Elephantine papyri (q.v.) it is not improbable that there was a Jewish colony at Heliopolis as well as at Elephantine. Chap. xxiii is plausibly supposed by Duhm to be an elegy on the destruction of Sidon in 348 B.C.

The judgment of the world in chaps. xxiv–xxvii, with its elaborate eschatological programme, appears to many scholars to be very late—some think of the time of Alexander, others of the second century B.C. To the same epoch the prophecies in chaps. xxxiv–xxxv are frequently assigned, and chaps. xxxii–xxxiii are also regarded by many as postexilic. If chaps. xxxvi–xxxix were taken from 2 Kings xviii. 13–xx. 19, they are later than the exile; but even if both recensions came from an earlier source, this appears to have been a biography of the prophet, and not a collection of his oracles. It is evident that, if the sayings here ascribed to Isaiah were uttered by him, his attitude must have undergone a very marked change, which to many students seems wholly improbable. In reference to chaps. xl–lxvi it was for a long time held that these chapters were written towards the end of the Babylonian exile by an unknown prophet whom it has become customary to call Deutero Isaiah. Questions arose, however, concerning four poetical descriptions of the Servant of Yahwe—some considering these as earlier, some as later, than the main work—and the genuineness, in this sense, of a number of Songs of Zion was also doubted. Later Duhm's view gained wide acceptance, according to which chaps. lvi–lxvi were written in the middle of the fifth century by an author who has been designated as Trito Isaiah. While Deutero Isaiah was supposed to have lived either in Babylon or in Egypt or in Phœnicia, Trito Isaiah was regarded as being a citizen of Jerusalem. This solution of the problem has not been adopted by all scholars who reject the Isaianic authorship, though it is the prevalent one at present. Some still adhere to the essential unity of the whole appendix (xl–lxvi) and its origin c.540 B.C. This appears to be the position of Wellhausen (*Israelitische und jüdische Geschichte*, 7th ed., Berlin, 1914). On the other hand, doubts have recently been expressed as to the accuracy of either view. Torrey has voiced his conviction that all of these chapters were written by the same man later in the Persian period. He has not yet published his reasons for this conclusion. But they are undoubtedly connected with certain difficulties that are not satisfactorily met by the scholars who advocate the current opinions and which seem to necessitate a reconsideration from a new point of view. In the very first lines it is Jerusalem that is addressed as Yahwe's people and comforted with the hope of better conditions and the return of exiles. These are to come from the north and the south, the east and the west (xliii. 5, 6), presupposing the scattering of the Jews in all of these directions. There is no sign that the author himself belongs to the dispersed Jews. He speaks to the heart of Zion, and the exiles are always in the distance. When he refers to those living in Babylonia, he asks them to come forth from Babylon (xlviii. 20); and in speaking of the effects of Jerusalem's redemption "in the eyes of all the nations" he advises his people to "go out from thence" (lii. 11). His standpoint seems to be Jerusalem everywhere. The desire for a return of exiles from all parts of the earth is as marked in lx, lxvi. 20, as in the earlier chapters. The comforting note is found in the later chapters as well as in the earlier, and the consciousness of Israel's unworthiness, unbelief, and sin is met with in both. The mention of Cyrus in xliv. 28 and xlv. 1 has naturally led to the idea that the end of the exile is the historic situation. But in xlv. 1 "To Cyrus" is metrically redundant and looks like a later addition, and the lines referring to Cyrus in xliv. 28 have the appearance of being a homeless fragment finally interpolated here, while it once seems to have been part of an oracle ascribed to Jeremiah, as 2 Chron. xxxvi. 22, 23, Ezra i. 1, 2, suggests. Passages supposed to refer to Cyrus may in reality apply to the Servant of Yahwe or to a Judæan high priest or king. It is evident that the figure of the Servant of Yahwe, so differently interpreted in modern times, already puzzled the ancient scribes, and some of their exegesis is likely to have left traces in the text itself. The assumption that the Samaritans at the time of Ezra and Nehemiah, their sins and their heretical purpose to build a rival temple on Mount Gerizim, are alluded to in lvi–lxvi does not seem to be well founded. Such descriptions as we have, even from prejudiced sources, of the Shechemite community do not intimate that they were guilty of the practices denounced in lvii, lxv, and lxvi. A distinction seems to be made between the servants of Yahwe who tremble at His word and the sinners who in reality are apostates from the faith and have become pagans, though they hypocritically continue to participate in the official cult, and the sins enumerated seem to suggest the conditions of the Hellenizing Jews in Jerusalem in the second century B.C. It is not necessary to interpret lxvi. 1 ff. either as a condemnation of all temple service or of the attempt to build a new temple; the passage voices essentially the same feeling as 1 Kings viii. 27, and the following verses seem to denounce those who offer legitimate sacrifices, but also such as are heathenish and proscribed by the Law. The awful picture of Yahwe's vengeance on Edom and other peoples in lxiii likewise has the appearance of reflecting the victories of the Hasmonæan period. Already Grotius and Houbigant thought that this period was in the prophet's mind. From the internal evidence it would not be impossible, therefore, to maintain that the bulk of the appendix comes from the fourth century B.C., with interpolations and additions made in the second century B.C. But it should be strongly borne in mind that all such theories can only be tentative, and that a vast amount of labor and thought will have to be expended on this remarkable work before anything more can be affirmed as a fixed result of science than the bare fact that this anonymous appendix reflects conditions later than the capture of Jerusalem by Nebuchadnezzar. Eminent Catholic scholars still maintain that all parts of the Book of Isaiah come from the prophet who lived in the eighth century. Their arguments are based chiefly on the conception of prophecy as implying accurate prognostication of future situations, regardless of the needs and understanding of those immediately addressed, and partly on the similarity of certain phrases to Isaiah's style, explained by the critics as due to imitation by later writers or copyists.

Concerning the date of those passages that are ascribed to Isaiah by almost all scholars, it is generally held that chap. i originated c.705–701 B.C.; ii. 6–iv. 1, v. 1–23, and vi, c.737 B.C.; viii. 1–18, c.734 B.C.; ix. 7–x. 4, c.737–734 B.C.; x. 5–15, c.701 B.C.; xvii. 1–11, c.737–734 B.C.; xviii, c.701 B.C.; xxii. 1–14, c.701 B.C.; xxii. 15–

25, c.705 B.C.; xxviii. 1–4, c.724 B.C.; xxviii. 7–xxxi, c.701 B.C.; and the substance of vii, c.734 B.C., and of xx, c.711 B.C. The characteristic attitude of Isaiah is one of awe before the majesty of Yahwe, and fearless denunciation of all that is high and exalted on earth, of the disobedience to Jahwe's moral commands, the attempt to placate Him by sacrifice and temple worship, the dependence upon warlike preparations and political alliances rather than on Yahwe, and the lack of faith in His safe guidance. He was convinced that the mass of the people because of its infidelity would go under, and that only a remnant would turn to their God after severe affliction. So far as the people at large was concerned, he cherished no illusions as to the effect of his oracles; he realized that they would have a tendency to harden the hearts of many and goad them on to their doom. But he deposited his faithful testimony in the hearts of his disciples, and to this unknown circle of believers we probably owe the preservation of his prophecies. The terseness and vigor of his style, his command of all the resources of the language, his mastery of invective, sarcasm, and irony, the impetuousness of his speech, the grandeur and sublimity of his conceptions, and his uncompromising emphasis on the ethical demands, mark him as an extraordinarily gifted, powerful, and enlightened personality, as perhaps the greatest of all the Hebrew prophets. But the tremendous influence exercised by the book that bears his name is possibly due in even a larger measure to the remarkable prophet of an entirely different type to whom it is supposed that we owe the substance of the appendix (chaps. xl–lxvi). Some of his leading ideas became the heritage of his people and affected the development of religious thought in the Church to an extent that can scarcely be affirmed of any conception ascribed with certainty to Isaiah himself. There is no God but Yahwe, and Israel is His servant; the other gods are nothing but lifeless images; He alone can predict the future and reveal it to His prophets; He is the creator of the world, He has chosen Israel to be His people; through his knowledge and his suffering, which has redemptive value, the Servant of Yahwe, Israel, will establish Yahwe's law to the ends of the earth; the other nations are as nothing to Him; He exchanges them for Israel; He makes them lick the dust under the feet of His people, He overthrows them. These are the thoughts and sentiments repeatedly expressed. It is only necessary to remember the large place held in Judaism, Christianity, and Islam by the doctrines of monotheism, imageless worship, predestination, election for service and privilege, revelation, prophetic infallibility, and the rejection of the nations that know not God, to realize what a strong impact the grouping of these notions, whether original with the prophet or not, into a synthetic view of the world has made on religious thought in later generations. The reference to Isaiah in Ecclesiasticus xlvii. 22–25 shows that the author knew the appended chapters as a part of the book ascribed to the prophet; the Ode to Famous Men in which this reference occurs was probably written by Simeon Siracides, the son of Jesus Siracides, c.150 B.C. The book had practically its present form when it was translated into Greek in the first century B.C.

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ISANOMALOUS (īs'ȧ-nŏm'ȧ-lŭs) **LINES** (from Gk. *ἴσος*, *isos*, equal + Eng. *anomalous*, from Lat. *anomalus*, Gk. *ἀνώμαλος*, *anōmalos*, uneven, from *ἀν*, *an-*, priv. + *ὁμαλός*, *homalos*, even, from *ὁμός*, *homos*, same, Skt. *sama*, Goth., OHG. *sama*, Eng. *same*). Lines connecting places whose temperatures, pressures, etc., have equal departures from the average values appropriate to the respective zones of latitude. This term was first introduced by Dove.

ISAR, ē'zär. A tributary of the Danube and essentially the national stream of Bavaria. It rises in Tirol, a few miles north of Innsbruck, and, breaking through the Alps, enters Bavaria, where it flows at first north past the city of Munich and then northeast past Landshut, joining the Danube near Deggendorf (Map: Germany, E 4). Its total length is about 182 miles. Owing to its numerous falls and scarcity of water at certain points, the Isar is of little importance as a commercial waterway and is used mostly for the floating of timber.

I'SARA. The ancient name of the river now known as Isère (q.v.).

IS'ARD, or **IZ'ARD** (Fr., from Catalan *isart*, chamois, perhaps of Iberian origin). The chamois of the Pyrenees (*Rupicapra pyrenaica*), a smaller form, with shorter horns and a more foxy-red color than the typical gemse of the Alps. See CHAMOIS.

ISAROG, ē'sȧ-rōg'. One of the principal peaks of the island of Luzon, Philippines, situated in the southeastern part of the island in the Province of South Camarines, and occupying the isthmus between the Bay of San Miguel and Lagonoy Gulf (Map: Philippine Islands, D 4). It is an extinct volcano. Its height is 6450 feet; its base is 36 miles in circumference. Numerous streams have their sources on its slopes.

ISAU'RA. See ISAURIA.

ISAURIA, ī-sa̧'rĭ-ȧ (Lat., from Gk. *Ἰσαυρία*). The ancient name for a region in Asia Minor on the north side of Mount Taurus between Cappadocia, Lycaonia, Cilicia, and Pisidia. The Isaurians were a half-barbarous people, living by plunder. They displayed an indomitable spirit from the earliest times; with their Cilician neighbors they ravaged the Eastern waters with their piracies. In 78 B.C. they were reduced to a temporary submission by the Romans, but soon renewed their raids. The Romans endeavored to surround their country with a chain of fortresses. In the third century A.D. the Isaurians formed one nation with the Cilicians, and one of their number proclaimed himself Roman Emperor, but was put to death. A native of Isauria, Zeno, was Byzantine Emperor at the time of the fall of the Western Empire. The capital, Isaura, at the foot of Mount Taurus, the only important city, was a large, rich, and well-fortified place. It was burned, together with its inhabitants, by the Isaurians when unable to withstand the siege of the Regent Perdiccas, in the fourth century B.C. The country was rocky and barren, producing chiefly the vine, which was cultivated with care. Consult: Sterrett, "Wolfe Expedition to Asia Minor," in *American Journal of Archæology*, vol. iii (Baltimore, 1888); Sir W. M. Ramsay, *Historical Geography of Asia Minor* (London, 1890); and the article "Nova Isaura," in *Journal of Hellenic Studies* (ib., 1905).

IS'CA DAMNO'NIO'RUM. See EXETER.

IS'CA SIL'URUM. See CAERLEON.

ISCHIA, ēs'kyä. An island of south Italy, lying between the Bay of Naples and the Gulf of Gaeta, 7 miles southwest of Cape Miseno, the nearest point of the mainland (Map: Italy, D 4). Area, 17½ square miles. The chief industries are the manufacture of straw hats, oil, pottery, bricks, and tile. There are fisheries and shipbuilding. It is of volcanic origin, and is rocky and mountainous throughout, the highest point being the volcano Epomeo (2588 feet). Nevertheless, it is very fertile and is famous for its wine as well as for its exquisite scenery and climate, which make it one of the favorite resorts of tourists. The island is connected by steamers with the mainland. It markets white wine and fruit. It contains the towns of Forio and Casamicciola, the latter being the one most visited by tourists on account of its mineral springs, which are famous. Their populations in 1911 were respectively 5618 and 3434. Ischia, the capital, has a cathedral, a castle, a good harbor, and (1911) 7430 inhabitants. The island was first settled by Greek colonists, who abandoned it on account of its dangerous volcanic activity. It has been a number of times visited by earthquakes, especially in 1883, when the towns of Forio, Casamicciola, and Lacco Ameno were destroyed, and 1700 persons killed. Pop.. 1901, 26,891; 1911, 28,000.

ISCHL, ĭsh''l. A celebrated watering place, in the Crownland of Upper Austria, picturesquely situated in the centre of the Salzkammergut, 1533 feet above the sea level, on a peninsula formed by the rivers Traun and Ischl, 28 miles east-southeast of Salzburg (Map: Austria-Hungary, C 3). The fine parish church, built by Maria Theresa, a Kurhaus, a theatre, and a number of fine villas, including an Imperial villa, are the principal attractions. There are salt and sulphur springs, mud, pine-needle, vapor, and other baths, a whey cure, and a hydropathic establishment. Ischl is the summer residence of the Imperial family and is well patronized by the Austrian nobility as well as by foreigners, the annual number of guests being about 25,000. In the vicinity are extensive salt works, from which the brine is conducted to Ischl and there evaporated. Pop. (district), 1910, 28,611.

ISÉ, ĕ'sȧ. A central province of Japan, bordering on Isé Bay and adjoining Yamato on the west (Map: Japan, E 6). It is included in the Prefecture of Miye and contains several busy towns, the chief of which are Tsu, 36,408 inhabitants; Ujiyamada, 33,627; Yokkaichi, 30,140. Near Yamada are the celebrated Shinto shrines, called by the Japanese *Ryo-dai-jin-gu* (two-great-divine-temples), which rank first among all the shrines of Japan in point of sanctity, but not in point of antiquity. These shrines are annually visited by tens of thousands of pilgrims, who return with charms (consisting of chips of the wood), to be placed in the little shrine which stands on the *Kami-dana* (god-shelf) found in every Japanese house. Every six months there is a great festival, which is supposed to effect the purification of the whole nation from the sins of the preceding six months, and the possessor of a fragment of the cedar wands used in these festivals is protected from misfortune for the next six months. For a full account of the buildings, their arrangements, ceremonies, and the gods here honored, see the paper by Sir Ernest Satow in *Transactions of the Asiatic Society of Japan*, vol. ii (Yokohama, 1874).

ISEGHEM, ĕ'*ze*-gĕm. A town of Belgium, in the Province of West Flanders, 23 miles by rail from Bruges (Map: Belgium, B 4). It manufactures woolen, linen, and lace. Pop., 1900, 12,172; 1910, 14,158.

ISEGRIM, ĕ'*ze*-grĭm, **ISENGRIM**, **ISGRIM** (MHG. *Isengrim*, iron helmet). In German animal epos, the name of the wolf.

ISELIN, ėz'lăN', HENRI FRÉDÉRIC (1825–1905). A French sculptor, born at Clairegoutte, Haute-Saône. He studied under Rude in Paris and speedily made a name for himself by his portrait busts, which are distinguished for strong but sympathetic interpretation of character. He received the cross of the Legion of Honor in 1863. His "Jean Goujon" (1852) is in the Ministry of the Interior; "Picard, Dramatic Author," at the Institute; "Count Morny" and "Baron Poisson," at the Ecole Normale; "President Boileau," at the Luxembourg; "Donizetti," at the Conservatory of Music. Portrait statues by him at Versailles are "King Murat," "Prince Beauffremont," "The Duke de Morny," "Count Rambuteau," "Claude Bernard," and others.

IS'ENBRAS, or **IS'UMBRAS**, SIR. A hero of mediæval stories, originally presumptuous, but humbled by adversity.

ISEO, ė-zā'ō, LAKE, called also LAKE SEBINO (Lat. *Lacus Sevinus*). A lake in Lombardy, north Italy, 15 miles northwest of Brescia (Map: Italy, C 2). It is 605 feet above sea level, 15 miles long, from 1 to 3 miles broad, and its greatest depth is 984 feet. In shape it resembles somewhat the letter S. Through it flows the Oglio, a branch of the Po. In the middle of the lake is the island Siviano, 2 miles long, culminating in Mount Isola, 1965 feet above the sea. The population of the island in 1911 was 1167. Along the east side of the lake, over deep valleys and through lofty galleries, runs the highway from Iseo to Pisogne. North of the lake are to be seen the snow-covered Adamello Mountains. A steamer connects Sarnico and Iseo at the southern extremity of the lake with Pisogne and Lovere at the northern extremity. Iseo, which in 1911 had a population of 3521, markets wine, grain, olives, and chestnuts; it dyes and spins silk; and has several sardine and eel fisheries. There are ancient walls and a castle, also a communal theatre. Lovere, which in 1911 had a population of 4197, markets wine and cattle and spins silk. Its handsome church, Santa Maria in Valvendra, built in 1473 and restored in 1547, 1751, and 1888, contains frescoes by Ferramola and old paintings.

ISÈRE, ē'zâr'. A river of southeast France, rising in Savoy, at the west base of Mount Iséran (Map: France, S., K 3). It flows in a general southwesterly direction, forming great loops, through the departments of Savoie, Isère, and Drôme, past Albertville, Grenoble, the most important town on its banks, and Romans, and joins the Rhone 4 miles above Valence. The upper half of its course runs through a beautiful Alpine region around the foot of La Grande Chartreuse. A railroad follows its valley, which is the principal route to the most important Alpine passes south of Mont Blanc, and one of its upper tributaries leads to the Mont Cenis Tunnel. The entire length of the Isère is about 180 miles, for the last 90 of which, from Montmélian, it is navigable, but with difficulty, owing to its rapid flow and shoals and islands.

ISÈRE. A southeastern department of France, bounded on the north by the Department of Ain, on the west by the river Rhone, on the east by the Department of Savoie, and on the south and southeast by those of Drôme and Hautes-Alpes (Map: France, S., K 3). Area, 3179 square miles, of which nearly a half is arable land and a fifth under forest. Pop., 1901, 562,315; 1911, 555,911. The surface is level plateau land in the northwest, but mountainous in the south, where the scenery is very imposing. Pic Lory in the Oisans is 13,396 feet above the sea. The chief rivers, besides the Rhone, are the Isère, from which the department derives its name, and its affluents, the Drac and Romanche. The department is one of the richest in France in mineral products. Mines of iron, lead, silver, coal, and marble are worked. It has large forests and many mineral springs. Manufactures include gloves, silk, and paper. The vine is carefully cultivated in the valleys. Capital, Grenoble.

ISÈRE, COLOMBAT DE L'. See COLOMBAT DE L'ISÈRE.

ISERLOHN, ē'zēr-lōn'. An important manufacturing town of the Prussian Province of Westphalia, situated on the Baar, 15 miles by rail from Hagen (Map: Prussia, B 3). It manufactures chiefly needles, bronze, silver, and nickel wares, furniture, chemicals, wire (large electric cables), and machinery. Cadmium and zinc are dug from beneath the town. It has a Gymnasium and a training school for the metal industry. Pop., 1900, 27,265; 1910, 31,294.

ISERNIA, ē-zĕr'nyȧ. A city in the Province of Campobasso, Italy, 79 miles north of Naples, 1495 feet above sea level (Map: Italy, E 4). It has fine mineral springs. The ancient Samnite Æsernia was important because of its strong situation on an isolated hill. There are remains of huge polygonal walls and of an aqueduct. Isernia manufactures linen and pottery. It is the seat of a bishop. Pop. (commune), 1901, 9322; 1911, 9284.

ISERT, ē'sērt, PAUL EDMUND (1757–89). A Danish traveler. He went to the possessions of Denmark in Africa (1783) as chief surgeon at Fort Christiansborg, on the Guinea Coast, and three years afterward, because of having cured the sister of the Ashanti King, he was allowed to make extensive journeyings through the King's domain. He collected interesting details of native life and manners, and also visited the Antilles before returning to Denmark (1788). He was intrusted with the establishment of a colony in Africa and made an attempt upon the island of Rio-Volta, near Malfy; but he removed to Guinea, where he had landed all his accoutrements. There he and most of his company died of fever. The letters he had written to his family and friends were published at Copenhagen (1788) under the title *Reise nach Guinea und den caraibischen Inseln in America.* They are also contained in the Danish collection of Gyldendal (iii, 1790) and translated into Danish, Dutch, Swedish, Spanish, and French.

ISEULT, ē-sōōlt', **ISOLD, ISOLDE**, ĭ-sōld', **ISOND**, ĭ-sŏnd', **ISOUD**, ĭ-sōōd. A character in mediæval romance. The name occurs in a great variety of forms. 1. Iseult the Fair, wife of Mark, King of Cornwall, who through philtre is made to love his nephew, Sir Tristram. 2. Iseult of the White Hands, a princess of Brittany, the wife of Sir Tristram. See TRISTRAM.

IS'FAHAN'. See ISPAHAN.

I'SHAM, SAMUEL (1855–1914). An American portrait and figure painter, born in New York. He graduated from Yale University in 1875 and studied law, but after being admitted to the bar he turned to art and studied in Paris at the Académie Julian. He exhibited at both Paris salons and at the larger American exhibitions, and became a member of the National Academy in 1906. His most important achievement, however, was his *History of American Painting* (New York, 1905), the best work on the subject. It deserves high praise for its adequate treatment, sympathetic but usually just appreciations, and pleasing style.

ISHBO'SHETH. 1. In the Old Testament, a son of Saul. 2. A character representing Richard Cromwell in Dryden's *Absalom and Achitophel.*

ISHIM, ē-shēm' (Kirghiz *Isel*). A river of Siberia, the most important left affluent of the Irtysh, rising in the eastern part of the Territory of Akmolinsk. It flows in a westerly and then northeasterly direction till it empties into the Irtysh, after a course of about 1000 miles. It is free of ice about 190 days in the year, but is navigable for only 100 miles. It passes the towns of Akmolinsk, Petropavlovsk, and Ishim. The Trans-Siberian Railway crosses the river at Petropavlovsk.

ISH'IMO'TO, SHAROKU (1854–1912). A Japanese soldier. He rose in the military service to the rank of major general in 1898 and lieutenant general in 1904. For many years he had charge of the Tokyo arsenal, but in 1903 he gave up that post to become Vice Minister of War.

ISHMAEL, ĭsh'mȧ-ĕl (Heb. *Yishmā'ēl*, God hears). The elder son of Abraham and reputed ancestor of a number of North Arabian tribes. His story is given in Genesis xvi and xxi. It is said that Sarah, being barren, gave Hagar, her Egyptian handmaid, to her husband Abraham. When Hagar saw that she was with child, she began to despise her mistress, and as a result was harshly treated. This compelled her to seek refuge in flight; but at the advice of an angel, who foretold the birth of a son and also his character, she returned. The child was born, and at the age of 13 was circumcised. By this time Isaac was already born, and Hagar was driven out again with her son. The provisions given her by Abraham did not last long, and she had given up hope when an angel pointed out a well of water. Ishmael grew and dwelt in the wilderness of Paran, living by hunting. He married an Egyptian woman. The Egyptian origin of both Ishmael's mother and his wife has been questioned by some scholars, who regard the term "Mizrite" as signifying that they came from the region around Wadi el Arish (the Brook of Egypt) or, less probably, a district even farther east.

Scholars generally consider Ishmael, as thus portrayed, the personification of a group of tribes who were akin to the Hebrews and who at one time proved to be serious rivals. In making Ishmael the son of a bondmaid, the tradition reflects the Hebrew point of view, and it is noteworthy that among the Arabs, who regard themselves as descendants of Ishmael, it is Hagar who is the true wife of Abraham, and Ishmael is the favored son. (See HAGAR.) The home of the Ishmaelites was the wilderness to the south of Palestine, as far as the frontier of Egypt. Hebrew tradition accounts for this by having Abraham drive Hagar and Ishmael into the wilderness. Certain phases favorable to Ishmael could not be entirely obscured. Hagar and Ishmael are under the protection of the deity revealing himself at Beer-lahoi-roi. Power is promised to Ishmael and success in war, and his name (El hears) also points to the excellent terms of his relationship to the deity. In the representations of Hebrew writers a considerable section of central and northern Arabia is occupied by Ishmaelites. Their spread over this large territory is indicated in tradition by making Ishmael the father of 12 sons (Gen. xxv. 13–18). Hence we find among the Ishmaelites representatives of both types of the Arab—the fierce Bedouin and the Arab on the road to civilization, even engaging in commerce. According to Gen. xxxvii. 25, Ishmaelitish merchants carrying spices from Gilead bring Joseph to Egypt. (See JOSEPH.) This connection of Ishmaelites with Egypt or the territory immediately east of Egypt, to which name the Mizraim seems to have been also attached, is also introduced into the narrative which records that Hagar was an Egyptian and makes Ishmael also marry an Egyptian woman. It should, however, be added that the term Ishmaelite, like the term Midianite, comes to be used vaguely by Old Testament writers, and no conclusions are to be drawn from such usage as to genealogies of Arabic tribes. In a general way it was recognized that the clans of Arabia and the clans of Palestine were closely akin, and this was represented in tradition by tracing them back to the same ancestor, just as in another stratum of tradition Hebrews and Edomites are traced back to Jacob and Esau, who unite in the person of Isaac. See EDOM; JACOB; ISAAC; ESAU.

ISHPEMING, ĭsh′pė-mĭng. A city in Marquette Co., Mich., 15 miles west of Marquette, on the Duluth, South Shore, and Atlantic, the Lake Superior and Ishpeming, and the Chicago and Northwestern railroads (Map: Michigan, B 2). It is in the great Lake Superior mineral region and is the centre of the iron-mining district of the Marquette Range. Its interests are principally in iron mining, but gold and marble also are found in this vicinity and there are lumber mills. Settled about 1857, Ishpeming was chartered as a city in 1873. Among the noteworthy features are the Ishpeming and Lindgren hospitals, a Carnegie library, and Lake Michigamme, a summer resort. The government is administered, under a charter of 1891, by a mayor, annually elected, and a common council, of which the executive is a member. The waterworks are owned by the municipality. Pop., 1900, 13,255; 1910, 12,448.

ISHTAR, ĭsh′tär. The name of the chief goddess worshiped by the Semitic Babylonians, the Assyrians, and apparently also by the Gutians and the Lulubians. Either because of the meaning of the name, which is unknown, or the important position gained by this deity, Ishtar became a generic name for goddess. It is uncertain whether she was originally the local numen of some Akkadian community in Babylonia or a goddess worshiped by the Akkadians before they invaded this country. The latter is suggested by the fact that the name, somewhat differently pronounced, is found in all parts of the Semitic world; *Athtar* in Arabia, *Astar* in Abyssinia, *Atar* among the Aramæans, *Ashtar* in Moab, *Ashtart* in Canaan and Israel. But it has been maintained that the Ishtar cult is likely to have spread from Babylonia in different directions. The circumstance that the sex varies, so that Athtar, Atar, Astar, and probably Ashtar represent a male deity, Ashtart a female, and Ishtar either a male or a female, seems to point to an object that could be conceived of as either. Such an object is the planet Venus, which, like sun and moon, is now male, now female, and with which the Arabian Atarsamain and the Canaanitish Ashtart are closely related as Ishtar. In the absence, however, of a satisfactory etymology it is impossible to determine whether Ishtar was originally a designation of Venus, characterizing it, perchance, as the one that "musters" the heavenly hosts, or the name of a deity concerned with the fertility of the soil and of animal and human life, only subsequently identified with the planet. In either case the name seems to have been given by the Akkadians to Sumerian goddesses like Nanai of Erech (q.v.), Anunit of Akkad (see ACCAD), and others. It probably supplanted a Nina of Nineveh and some local goddess of Arbela. Ishtar of Erech was especially connected with the evening star, while Ishtar of Akkad was connected with the morning star. The latter was regarded as male (*zikarat*), in distinction from the former as female (*zinnishat*), which shows the vacillation as to sex within Babylonia itself. The goddess of Erech is represented as unmarried, but having a number of lovers, the most famous of them Tammuz, to whom she brings death and destruction. She is surrounded by priestesses of different grades, who symbolize their devotion to her service by rites of an obscene character. She also had male hierodules. Withal she was a goddess of a violent type, who encouraged her subjects in the fray and punished those who disobeyed her with fatal diseases. This warlike side of her nature is emphasized by kings like Hammurapi (2124–2081 B.C.), who appeared prominently in the rôle of conquerors. Ishtar of Arbela seems to have preserved more of the character of the stern virgin goddess of the chase and of war, while Ishtar of Nineveh was more of a goddess of love. The former gave, through her prophets and prophetesses, oracles to the Assyrian kings.

In the theological system Ishtar is represented as the daughter of Anu or Enlil and as the sister of Shamash, forming a part of the triad Shamash, Sin, and Ishtar, but occupying a place after the sun god and the moon god. By virtue of this preeminence in the heavenly host, she is known as the queen or mistress of heaven. Besides being identified with the planet Venus, she at times appears as the goddess representing the star Sirius; and as both Shamash and Sin were regarded in Babylonia and Assyria as male deities, she became the great mother goddess, the mother of mankind. In the representations of the goddess both sides of her nature, the destructive and the life-giving, are brought out. Among the Assyrians she is pictured generally as clad in flames, with a quiver hanging to both sides, a bow in one hand, and a sharp sword in the other; while in Babylonia the type that early became popular was that of the naked goddess, with prominent breasts and the organs of generation strongly emphasized, or the mother with the child at her breast. At Ras el-Ain in Mesopotamia a veiled Ishtar has been found.

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ISIAC (ī′sĭ-ăk) **TABLE.** The name formerly given to a bronze plate, 4 feet, 8 inches long and 3 feet wide, on which are depicted three rows of Egyptian deities inlaid in niello and silver. It seems to have been found in Italy and was sold by a soldier of the Constable de Bourbon to a locksmith, who sold it in 1527 to Cardinal Bembo. It excited much curiosity and gave rise to considerable discussion before Egyptologists had learned to decipher hieroglyphics. It is now preserved in Turin, but is almost forgotten, being considered as at best an imitation dating from the Roman period.

IS′IDORE OF CHARAX, kā′răks (Lat. *Isidorus Characenus*). A geographer of the first century A.D., born at Charax, on the Tigris, the author of *Travels in Parthia*, often quoted by Athenæus (q.v.), and of an extant work on a similar subject, entitled *Σταθμοὶ Παρθικοί*, which has survived. It is better known under its Latin title, *Mansiones Parthicæ*, and is published, with a Latin translation, in the series of *Scriptores Geographici* (Paris, 1839) and by Carl Müller, *Geographici Græci Minores*, vol. i (Paris, 1855).

ISIDORE OF SEVILLE, sė-vĭl′, Saint (?–636). An archbishop of Seville and one of the most distinguished ecclesiastics of the seventh century. He was born about 560 (or 570), probably at or near Cartagena, where his father, Severianus, had been prefect. Two of his brothers, Fulgentius and Leander, were bishops, the first of Astigi, the second of Seville; Isidore succeeded the latter in 600. The episcopate of Isidore is rendered notable by the two half-ecclesiastical, half-civil councils of Seville in 619 and of Toledo in 633, which were held under his presidency, and the canons of which may almost be said to have formed the basis of the constitutional law of the Spanish kingdoms down to the great constitutional changes of the fifteenth century. The decrees of councils and other Church laws anterior to his time, called by his name, are not from his hand. He died at Seville, April 4, 636. Isidore was the most learned man of his time, and his works are in the most various departments of knowledge—theological, ascetical, liturgical, scriptural, historical, philosophical, and scientific. The most complete edition is that of Arevaio (7 vols., Rome, 1797–1803), reprinted with addition of the canons and liturgy in Migne, *Patrologia Latina*, lxxxi–lxxxvi. We are indebted to Isidore for many fragments of Greek and Latin authors, among the number several of whom hardly any other remains have been preserved. In 1722 Benedict XIV made him one of the doctors of the Church. His *Sentences*, largely from Augustine and Gregory the Great, suggested Peter Lombard's *Sentences*, and his *Etymologies*, in 20 books (ed. by Otto, Leipzig, 1833), and by W. M. Lindsay (2 vols., Oxford, 1911), treating of the terms used in all the departments of knowledge in his time, was the great mediæval encyclopædia. Consult F. J. G. La Porte du Theil, "Notice de l'ouvrage d'Isidro de Seville sur les origines," in *Bibliothèque Nationale, Notices et Extraits des Manuscrits*, vol. xiv (Paris, 1798), and Ernest Brehau, *An Encyclopedist of the Dark Ages* (New York, 1912).

I′SIDO′RIAN DECRETALS. See Pseudo-Isidorian Decretals.

IS′IDO′RUS (Lat., from Gk. Ἰσίδωρος), Saint (c.370–c.440). A monk, often called *Pelusiota* or *of Pelusium*, from the monastery of which he was abbot. He was born probably at Alexandria, and tradition makes him a pupil of Chrysostom, but this is not certain. He is best known by his letters, of which about 2000 remain. They contain a mass of exegesis, often valuable in itself and always of importance for the construction of the early history of interpretation. They are edited in Migne, *Patrologia Græca*, vol. lxxviii (1860). Consult H. A. Niemeyer, *De Isidori Pelusiotæ Vita, Scriptis et Doctrina* (Halle, 1824), and P. B. Glück, *Isidori Summa Doctrina Moralis* (Wurzburg, 1848).

ISIN, Dynasty of. See Babylonia, *History*.

ISINGLASS, ī′zĭŋ-glȧs (from MDutch *huysenblas*, Dutch *huisblad*, Ger. *Hausenblase*, isinglass, sturgeon bladder, from MDutch *huysen*, Dutch *huizen*, OHG. *hūss*, Ger. *Hausen*, sturgeon + MDutch *blas*, Dutch *blad*, OHG. *blāsa*, Ger. *Blasen*, bladder, dialectic Eng. *blaze*, pimple; associated by popular etymology with Eng. *glass*). The dried swimming bladders of several varieties of fish. The amount of gelatin in isinglass is from 86 to 93 per cent and even more. It is prepared by tearing the air bladder or sound from the back of the fish, from which it has been loosened by striking several blows with a wooden club, and washing in cold water. The black outer skin is removed with a knife, again washed, and spread on a board to dry in the open air, with the white shiny skin turned outward. To prevent shriveling or shrinking, the bladders must be fastened to the drying board. The best quality of isinglass comes from sounds that are dried in the sun. After drying, the sound is again moistened with warm water, and the interior shiny skin is removed by hammering or rubbing. Finally, it is rolled between two polished iron rollers. If it is desired to extract the gelatin, the isinglass, while still in a moist condition, is immersed in a solution of sulphuric acid, in which it swells up to a colorless jelly which later is dissolved in warm water. On cooling and drying, a clear and colorless gelatin is obtained. The chief places of manufacture are Russia, Canada, Brazil, the West Indies, the East Indies, and Manila. The Russian varieties, which are supposed to be the best on the market, are made chiefly from the sturgeon; but elsewhere the bladders of cod, hake, and other fish are also used. Isinglass should be of a bright or light-yellow color, thin and transparent, and without any odor or taste. The latter naturally indicates the presence of impurities. When steeped in cold water and dissolved by heating, there should remain but a very small residue, and the jelly which is formed should be clear and colorless. Isinglass may be used for the same purposes as gelatin (q.v.). It is employed chiefly for clarifying beer and wine, for culinary purposes (in jellies and soups), for making cement, etc. The adhesive quality of court plaster is due to isinglass.

I'SIS (Gk. Ἶσις, Egyptian, *'Ise-t*, a name of obscure etymology). An Egyptian goddess, the daughter of Seb (Earth) and Nut (Heaven) and the sister and wife of Osiris (q.v.). Herodotus identified her with Demeter and described her as the greatest of the Egyptian goddesses. After the treacherous murder of her husband by his brother Set (q.v.), Isis fled to the swamps of the Delta, accompanied by seven scorpions. On one occasion the mistress of a house in which she sought shelter, fearing the scorpions, turned the goddess from her door, and the scorpion Tefen crept into the house and stung the son of the woman so that he died. But Isis, moved by the woman's grief, laid her hand upon the child and restored him to life. Shortly after this Isis gave birth to her son Horus, whom she placed in the charge of Buto, the goddess of the north. Buto guarded him carefully, but in spite of all her care he was stung by a scorpion, and his mother found him lying lifeless on the ground. At her prayer the sun god Rê stopped his ship in midheaven and sent down Thoth, the god of wisdom, who soon brought Horus back to life. Leaving her young son in the Delta, carefully hidden by Buto from the malevolence of his uncle Set, Isis next went through the world seeking the body of her husband, Osiris, which, inclosed in a chest, had been borne out to sea by the Nile. In her wanderings she was accompanied and protected by Anubis (q.v.), the son of Osiris by his sister Nephthys (q.v.). After a long search she found the body of Osiris. The chest inclosing it had drifted ashore near Byblos, on the Phœnician coast, and had become embedded in the trunk of a great tree which had grown around it. The King of the country, ignorant of the presence of the chest, had caused the tree to be cut down and made of it a pillar for his house. Isis entered the King's service as nurse to his child and endeavored to confer immortality on the infant. Every night she burned away his mortal part with celestial fire, while she herself, in the form of a swallow, flew round the pillar lamenting her husband. One night the Queen, Astarte, came upon her while thus engaged, and crying out in terror at the sight of the child surrounded with flames, destroyed his chance of immortality. Isis now revealed herself, drew the chest from the pillar, and conveyed the body of her husband by ship to Egypt, where she hid it and went to visit her son. Set, however, found the body of Osiris and tore it to pieces, which he scattered in every direction. Learning of this misfortune, Isis took a boat, and seeking her husband's scattered members throughout the land, found all the pieces except the phallus, which had been eaten by fishes. Wherever she found a portion of the body she buried it, and in aftertimes each of these spots was revered as the burial place of Osiris. His head, e.g., was buried at Abydos, and his backbone at Busiris, in the Delta. Isis reared her son Horus in concealment, and when he reached mature age he defeated Set and ascended his father's throne. In the legends of the sun god Rê, Isis is represented as possessing special skill in magic and in the healing art; in this character, as the "great mistress of enchantments," her aid is frequently invoked in the Egyptian magical texts. Her sacred animal was the cow, and she is sometimes represented with the head of a cow, though more frequently she wears only the horns. She is also very commonly depicted as a woman wearing upon her head a throne—the ideogram used in writing her name. In later times she is often represented as seated and holding the infant Horus to her breast.

Isis was very generally worshiped throughout Egypt, but special honor was paid to her at Abydos and Busiris. In later times the centre of her cult was in Philæ (q.v.), where magnificent temples were built to her. Here she was still revered as late as 453 A.D., long after paganism had been suppressed in other parts of the land by edict of Theodosius, her special worshipers being the savage Blemmyan tribes who constantly menaced the safety of Egypt. From Alexandria, where the worship of the triad Serapis (q.v.), Isis, and Harpocrates (q.v.) overshadowed that of all other Egyptian deities, the cult of the goddess spread throughout the whole Hellenic world, and temples were erected to her in many places. It was introduced into Rome in the time of Sulla (86 B.C.) and soon became fashionable, but was brought into ill repute by the licentiousness of its priests, and the government made occasional attempts to suppress it. Under the Empire the cult of Isis became very popular, and Domitian, Commodus, and Caracalla were among the priests of the Egyptian goddess. At the opening of spring (March 5) both Greeks and Romans held a festival in which a ship was carried in solemn procession in honor of Isis. In the Roman Calendar the day of this festival was designated as *Navigium Isidis*.

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ISIS. A name sometimes applied to the upper course of the English Thames (q.v.).

ISIS AND SER′APIS, Temple of. A great temple in ancient Rome, situated on the Campus Martius near the baths of Agrippa. The temple itself, a pure Egyptian structure, was built of material transported from the Nile. It was inclosed by a peristyle dating from Domitian's time and closely resembling the inclosing wall of his forum, and was approached by a sacred avenue, on the sides of which many great works of Egyptian art were set up. At each end of the avenue stood a gateway with two obelisks, of which one now stands in the Piazza della Rotonda, one in the Villa Mattei, and one in the Piazza dei Cinquecento. Many important works of art have been discovered on the site of the temple, chief among them the Tiber statue, in the Louvre, and the Nile group, both of which were carried away by the French in 1803. The Nile was returned after Napoleon's fall and now stands in the Vatican Museum. Other important finds were the reclining statue of the Ocean, in the Naples Museum, two sphinxes, various portrait statues, relief columns, and other architectural remains. See Serapeum.

ISKANDER, ē-skăn′dẽr. 1. The Turkish form of Alexander. 2. The nom de plume of Alexander Herzen (q.v.), a Russian politician and publicist.

ISKANDERUN, ē-skăn′dẽ-rōōn′. A city of Turkey in Asia. See Alexandretta.

ISLA, ēs′lȧ, José Francisco de (1703–81). A Jesuit preacher and satirist, born in Villavidanes, in the Kingdom of León, Spain. He was a man of acute wit and intense humor. He ridiculed a royal pageant (held, in honor of the accession of Ferdinand VI, at Pamplona in 1746) in his *Triunfo del amor y de la lealtad: Dia grande de Navarra*, an ironical eulogy so artfully disguised that at first it was regarded as an honest adulation, but upon its burlesque character becoming known he was compelled to leave the city. His most important satire was the *Historia del famoso predicador Fray Gerundio de Campazas, alias Zotes* (1758), in whose adventure he held up to public contempt the ignorance and audacity of the itinerant friars of the time and ridiculed unmercifully their debased pulpit oratory. It was condemned in 1760 by the Inquisition on the clamor of the lower clergy, but the second part appeared surreptitiously in 1768. Of Isla's other productions may be mentioned: the *Juventud triunfante* (1727), a work written in collaboration with Luis de Lovada, and one in which the satirical aim is most cunningly hidden; the *Cartas de Juan de la Encina* (1784), which assails the charlatanry of Spanish physicians; his *Cartas familiares* (2d ed., 1790); the *Sermones* (1792), not so attractive as his satirical treatment would lead one to expect, but amply justifying his reputation as an effective preacher. Apart from the publication of the *Fray Gerundio*, Isla owes his chief fame to his translation of the picaresque novel of Le Sage, the *Gil Blas*. The text appeared in 1783, but it is now more widely read in the considerably modified arrangement by Evaristo Peña y Martín, which appeared in 1828. Consult: De Calas, *Vida de J. F. de Isla* (Madrid, 1803); selections from his works in *Biblioteca de autores Españoles*, vol. xv (Madrid, 1850); Policarpo Mingote y Tarrazona, *Varones ilustres de la provincia de León* (León, 1880); Claretie, *Lesage romancier* (Paris, 1890); Gaudeau, *Les prêcheurs burlesques en Espagne au XVIIIe siècle* (ib., 1891); Lintilhac, *Le Sage* (ib., 1893); V. Cian, *L'Immigrazione dei Gesuiti Spagnuoli letterati in Italia* (Torino, 1895); Alonso Cortés, *El supuesto autor del "Fray Gerundio"* in *Miscelánea Vallisoletana*, pp. 39–47 (Valladolid, 1912).

ISLA DE LÉON, ēs′lȧ dȧ lȧ-ōn′. An island in the Bay of Cadiz. See San Fernando.

ISLA DE PINOS. See Isle of Pines.

ISLA DE VIEQUES. See Vieques.

ISLAM, ĭs′lam *or* ĭz′lam, *Ar. pron.* ĭs-läm′ (Ar., submission, from *salima*, to be safe). The name used by Mohammedans as the designation for their religion. It may be traced back to Mohammed. Literally, it means a causing to be sound or safe, or that which makes safe, but is commonly interpreted to mean complete and entire submission of body and soul to God (Allah), His will and His service, as set forth in the articles of faith, the commands and ordinances believed to have been revealed by God to His Prophet Mohammed. The more usual designation of the religion among Western peoples is Mohammedanism (q.v.).

ISLAMABAD, ĭs-lä′mȧ-bäd′. A city of British India. See Chittagong.

ISLAND (AS. *īglond*, *ēglond*, Icel. *eyland*, Ger. *Eiland*, from AS. *īg*, *ēg*, Icel. *ey*, OHG. *ouwa*, Ger. *Au*, island; connected with AS. *ēa*, Goth. *ahwa*, OHG. *aha*, Lat. *aqua*, water + AS., Icel. *land*, OHG. *lant*, Ger. *Land*, land; connected with Ir. *lann*, land, Welsh *llan*, land, OChurch Slav. *lendina*, waste land, OPruss. *lindan*, valley; influenced by popular etymology with the unrelated *isle*). A relatively small body of land entirely surrounded by water. Primarily it differs from a continent only in size, although continents have a physical and biological individuality which islands do not possess. Islands are formed in various ways. Those of continental character are separated by short stretches of usually shallow water from the mainland with which they have a geological similarity. They may be formed either by marine erosion or by subsidence of the coast beneath ocean level. The small islands off Norway, Scotland, Maine, and Patagonia are to be regarded as the remnants of hills and mountains, of which the basal portions and intervening valleys have been "drowned" by a general subsidence. The British Isles, Sicily, and Japan represent larger land masses, whose former union with the mainland is indicated by submarine banks; Madagascar, on the other hand, is separated by a deep channel from the African coast. Another type of continental islands owes its origin to the constructive work of rivers, such as the islands at the mouth of the Nile and the Mississippi (see Delta), or to ocean currents, such as the sand bars along the Atlantic coast of the United States. Islands of coral formation are usually low and limited to the warmer regions of the oceans. (See Coral Island and Coral Reef.) Volcanic islands, consisting of active or extinct lava cones, occur in great numbers in the Pacific and Indian oceans, while in the Atlantic they are represented by St. Helena, Ascension, and the Azores. Submarine eruptions leading to the construction of cones above sea level have taken place in recent times. The island of Johanna Bogoslava in Alaska appeared in 1796 and four years later had grown to a height of 3000 feet. In 1907 a new volcano, known as McCulloch Peak, was blown up, and its place once more occupied by the sea. Another noted instance is Graham Island (Ferdinandea) in the Mediterranean, which was thrown up in 1831, reaching a height of 200 feet and with a circumference of 3 miles. This island soon disappeared. Oceanic islands—i.e., those situated far from continental lands—with but few exceptions, are of volcanic or coral growth.

Islands are subject to changes of form and contour by various physical agencies. They may be gradually consumed, owing to the erosive action of waves and currents, until their former existence is made known only by a submarine platform. Helgoland, in the North Sea, has suffered thus for many centuries; and the eastern coast of England is wasting at a rapid rate. Volcanic islands are liable to destruction by violent explosions, such as that occurring at Krakatoa in 1883. Under certain conditions islands lying near the coasts of continents may be united to the latter; the peninsula of Shantung, once insulated, has been connected with the mainland by the growth of the Hoang-ho delta.

Island Flora. The floras of isolated oceanic islands, such as the Hawaiian Islands and Galapagos Islands, are very different from the floras of the continents. These differences in most cases affect not only species but also genera, and in one or two cases there are even distinct families which are confined to oceanic islands; in fact, island floras are the most endemic (see ENDEMISM) of all floras. The reason for these phenomena is doubtless that islands have long been isolated from continents, and the progress of evolution has been peculiar to the various islands themselves and uninterrupted by outside invasions. Not only do islands show peculiar floristic types, as has been shown, but they are also rich in certain plant families, among which the ferns have a predominant importance. It is almost certain that the abundance of ferns on oceanic islands is due to the much greater ease of migration that ferns possess as compared with seed plants, by reason of the light spores that can be carried for long distances in the wind. Islands also have a large number of plants whose seeds are scattered by birds, by water currents, or by man.

Island Fauna. For the general characteristics of the fauna of islands, see ISOLATION. Examples of individual peculiarities in island faunas will be found under GALAPAGOS ISLANDS; ETC.

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ISLAND, FLOATING. See FLOATING ISLAND.

ISLAND CITY, THE. A name for Montreal.

ISLAND NUMBER TEN. An island which existed, until shortly after the Civil War, in the Mississippi River, about 40 miles below Columbus, Ky. (near the boundary line between Kentucky and Tennessee), thus named from its position in the series of islands below Cairo, Ill. After the first Confederate line in the West had been broken by the capture of Fort Henry and Fort Donelson (q.v.), the garrison at Columbus, Ky., constituting the Confederate left flank, was withdrawn to New Madrid (q.v.) and Island Number Ten and placed in command of General McCown, who was later replaced by General Mackall. Early in March, 1862, a Federal army under General Pope and a Federal fleet under Commodore Foote advanced against these positions. On the 16th New Madrid surrendered to Pope, who then marched about 25 miles down the river, and with the assistance of transports which had been brought through a laboriously constructed channel, across a peninsula formed by a loop in the Mississippi, from a point above the island to New Madrid, succeeded in attaining the Confederate rear at Tiptonville, the Confederate batteries along the east bank having been previously silenced by the gunboats *Carondelet* and *Pittsburgh*, which, under Captain Walke and Lieutenant Commander Thompson, had successfully run by the island on April 3 and April 7 respectively. Meanwhile Foote's fleet had kept up a fairly continuous though ineffective bombardment. The Confederate garrison, which numbered between 6000 and 7000, threatened in front and rear, and completely cut off from retreat by the Federal forces and impenetrable swamps, finally surrendered on April 7; many guns and stores were also captured. The Federal loss was less than a dozen men. The cutting of the channel across the peninsula formed by the loop in the river required great labor and considerable engineering skill, while the running of the batteries by Henry Walke (q.v.) was not only one of the most dramatic deeds of the war, but completely overcame the Confederate defense of this position. After the war the old Island Number Ten was gradually washed away by the river, and a new one was slowly formed on the opposite shore. Consult A. T. Mahan, *The Gulf and Inland Waters* (New York, 1898), and Johnson and Buel (eds.), *Battles and Leaders of the Civil War*, vol. i (ib., 1901).

ISLAND OF SAINTS (Lat. *Insula Sanctorum*). A name given to Ireland in the Middle Ages, from her great number of ecclesiastics and missionaries.

ISLAND OF THE SEVEN CITIES. A legendary island settled by seven bishops and refugees from Spain and Portugal at the time of the Moorish Conquest.

ISLANDS OF THE BLESSED (Lat. *Fortunatæ Insulæ*, Gk. *Αἱ Τῶν Μακάρων Νῆσοι*, *Hai Tōn Makarōn Nēsoi*). According to an old Greek myth, certain islands situated towards the edge of the western ocean, where was the abode, not of departed spirits, but of certain favored mortals rescued from death by the gods. Here life was most easy, the climate soft and springlike, and there was abundance of all things. Homer does not refer to these islands, but speaks of the Elysian Plain, a place with like characteristics (*Odys.*, iv, 563: see ELYSIUM). Hesiod, *Works and Days*, 168, and Pindar, *Ol.*, ii, with later poets, speak of the islands. Later authors identified the islands with the Canaries, lying outside the Pillars of Hercules, in the Atlantic Ocean.

ISLAY, ī'lā. A Scottish island, one of the Inner Hebrides, included in Argyllshire, 15 miles west of the peninsula of Cantire, and southwest of the island of Jura, from which it is separated by the Sound of Islay (Map: Scotland, B 4). Area, 220 square miles, of which about 22,000 acres are under cultivation. The north of the island is hilly, and along the east shore runs a ridge rising from 800 to 1400 feet in height of an ancient schistose character similar to the rocks of Argyll and Donegal of northwestern Ireland, indicating a previous connection. The central and west districts are undulating or flat, with great peat deposits. Whisky distilling is the principal industry. Pop., 1901, 6857; 1911, 6274.

ISLE′BIUS, Magister. A name sometimes applied to Luther's disciple Johann Agricola (q.v.).

ISLE DE RHONDE. See Grenadines.

ISLE OF LADIES. A poem attributed to Chaucer, which first appeared in Speght's edition (1597) of Chaucer. It is also called "Chaucer's Dream."

ISLE OF MAN. See Man, Isle of.

ISLE OF PINES, or Sp. Isla de Pinos, ē′slȧ dā pē′nōs. An island belonging to Cuba, situated about 40 miles southeast of the south coast of the Province of Pinar del Río (Map: Cuba, C 5). It is almost circular in outline, with a diameter of about 40 miles and an area of 840 square miles. It is hilly and well forested with pine, cedar, and mahogany in the northern part, while the southern consists of a low marsh, similar to the Everglades of Florida, covered with mangrove thickets and presenting a luxuriant wealth of native flora and fauna. The soil of the northern part is sandy and favorable to the growth of pineapples and potatoes, the latter being of excellent quality. There are some mineral deposits, of which only the marble quarries are exploited. Cattle raising and the production of citrus fruits are the chief industries. Since the Spanish-American War the island has been exploited by Americans. It has been Americanized to a large extent, and unsuccessful attempts have been made to bring it under the jurisdiction of the United States. Pop., 1899, 4076; 1907, 3276, chiefly concentrated in the town of Santa Fé and the capital, Nueva Gerona, situated near the north coast.

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ISLE OF PORTLAND. See Portland, Isle of.

ISLE OF THANET. See Thanet, Isle of.

ISLE OF WIGHT. See Wight, Isle of.

ISLES, Lords of the. A line of Scottish chiefs, celebrated in poetry and romance. Sir Walter Scott, in his notes to *The Lord of the Isles*, speaks of Somerled as Lord of the Isles; but it is probably more correct to speak of him as King of the Isles. The later lords of the isles traced their descent from him. He appears prominently in Scottish history in the middle of the twelfth century, during the reigns of David I and his grandson and successor, Malcolm IV. The race to which he belonged is uncertain; probably, like most of his subjects, he was of mixed descent, Norwegian and Celtic. One of his descendants, Angus of the Isles, gave his fealty to Bruce when the latter was most hard pressed at the beginning of his reign, receiving him into his castle of Dunaverty, and afterward fought under the Great King at Bannockburn. This chief is the hero of *The Lord of the Isles*, but his name, for the sake of euphony, was changed to Ronald. John Macdonald, first Lord of the Isles, son of Angus Og, received a grant from Edward Baliol of Mull, Skye, Isla, Giblia, Kintyre, Knapdale, and other lands. He married Margaret, daughter of Robert II, founder of the Stuart dynasty. During the troubled and disastrous reign of David II, John of the Isles was able to maintain himself in a state of practical independence of the Scottish crown. He was at last, however, compelled to submit. He met David at Inverness in 1369 and gave hostages for his fidelity. He died about 1386. The most powerful of this race was Donald, eldest son of John. He set the kings of Scotland at defiance and made treaties as an independent sovereign with the kings of England. He married Mary Leslie, daughter of the Countess of Ross. Mary's brother, Alexander, Earl of Ross, by his marriage with the daughter of the Regent Albany, left an only child, who became a nun. Donald claimed the earldom in his wife's right, and when his claim was refused by the Regent he prepared to maintain it by force. Taking possession of Ross, he marched at the head of a large army from Inverness, through Moray and Aberdeenshire, and threatened to destroy the burgh of Aberdeen. Donald fought a drawn battle at Harlaw with the Earl of Mar on July 25, 1411, but was compelled to retreat and renounce his designs. He died about 1420 and was succeeded by his son Alexander. John, son of Alexander, in 1462 made a treaty with Edward IV of England, by which he promised to assist the English monarch in the conquest of Scotland.

Throughout their history the Lords of the Isles plotted against the Scottish crown and were a constant menace to the tranquillity of the realm. The last regular lord was John, who forfeited his title in 1493. After him there were several spurious claimants, and at least one who was recognized for a time as Lord of the Isles. Consult: Skene, *Celtic Scotland*, vol. iii (Edinburgh, 1880); Lang, *History of Scotland*, vol. i (ib., 1900); Skene, *Highlanders of Scotland*, edited by Macbain (Stirling, 1902).

ISLES OF SHOALS. A cluster of seven barren, rocky islands and several rocks and ledges, in the Atlantic Ocean, off the coast of New Hampshire, from 5 to 6 miles southeast of Portsmouth. The two largest are Appledore, containing 400 acres, and Star, 150 acres. On these are large hotels chiefly for summer guests, who resort there for the sea air, boating, and fishing. A steamer runs daily from Portsmouth. On White Island is a revolving light 82 feet above the sea. These islands are inhabited by a few fishermen. Consult: J. S. Jenness, *The Isles of Shoals: An Historical Sketch* (New York, 1873); C. L. Thaxter, *Among the Isles of Shoals* (Boston, 1901); id., *My Island Garden* (ib., 1904); Rufus Emery, "The Isles of Shoals," in *Magazine of History*, vol. xiii (New York, 1911).

ISLES OF THE BLESSED. See Islands of the Blessed.

ISLETA, ē-slä′tȧ. An important pueblo of Tanoan stock, situated on the west bank of the Rio Grande, a few miles below Albuquerque, N. Mex. It ranks third among the pueblos, coming after Zuñi and Laguna, with a population of 956. As in all other pueblos, the people are peaceable, industrious, and self-supporting, raising good crops of corn, vegetables, and fruit, all produced from an arid soil by aid of native irrigation.

Isleta del Sur is the name of a small pueblo on the north bank of the Rio Grande, about 14 miles below El Paso in Texas. It was originally established under mission auspices by refugees from the original Isleta, above noted, who accompanied the Spanish army on its retreat from New Mexico in the Pueblo revolt in 1680. Although considerably Mexicanized, the inhabitants still keep their Indian form of government, their dances, and foot races; and four or five persons remember some of the language. See Pueblo; Tanoan Stock.

ISLE VERTE, ēl vĕrt. A town, subdistrict, island, and river of Quebec, Canada. The town is the capital of Temiscouata County and stands on the right bank of the St. Lawrence at the mouth of the Isle Verte River and opposite the Isle Verte (Map: Quebec, J 2). It has a station on the Intercolonial Railway. The inhabitants are mostly French-Canadians. Pop. of census subdistrict, 1901, 2256; 1911, 2169.

ISLEWORTH, ī′z’l-wẽrth. A suburb of London. See Heston and Isleworth.

ISLINGTON, ĭz′lĭng-t*o*n. A metropolitan borough of London, in Middlesex, comprising four parliamentary divisions, 2½ miles north of St. Paul's (Map: London, D 7). In Liverpool Road is the Royal Agricultural Hall with a capacity of 50,000 persons, in which the national horse and cattle and other great shows are held. Here also are located Pentonville and Holloway prisons and the London School of Divinity. Pop. of borough, 1901, 334,991; 1911, 327,423.

IS′LIP. A town in Suffolk Co., N. Y., on Great South Bay, 43 miles east of New York City, on the Long Island Railroad (Map: New York, B 2). It is about 12 miles in length and 10 miles in width, comprising a number of villages. Islip is a summer resort with many costly residences. Great South Bay, attractive for sailing, is frequented also at other seasons for fishing and hunting. Within the limits of the town are the Central Islip State Hospital, St. Joseph's Convent, and a fish hatchery. Other points of interest are the Fire Island Lighthouse, 166 feet high, and Fire Island State Park. Blue Point oysters are shipped in great quantities. The government is vested in a supervisor, elected biennially, and a town board, made up of the justices of the peace, the town clerk, and the supervisor. Pop., 1900, 12,545; 1910, 18,346.

ISLY, Duc d'. See Bugeaud de la Piconnerie, Thomas Robert, Duc d'Isly.

ISMAIL, ēs′mȧ-ēl′. Capital of a district of the same name in the Government of Bessarabia, Russia, situated on the north bank of the Kilia, an arm of the Danube, and on the Rumanian frontier (Map: Russia, C 5). It carries on a considerable trade in grain and other agricultural products and has a customhouse. Its position on the frontier adds greatly to its commercial importance. Its manufacturing establishments include a large number of flour mills, brickkilns, a crockery kiln, tannery, etc. Steamships connect it with Odessa and other Black Sea and Danube ports. Pop., 1897, 33,607; 1911, 35,708. Ismail is mentioned in the sixteenth century as a fortress and was of great strategical importance under the Turkish rule. In 1632 it was sacked by the Cossacks. It was taken and destroyed by Suvaroff in December, 1790; came into the possession of Russia in 1812; was assigned to Moldavia by the Treaty of Paris, 1856, and transferred to Russia again by the Berlin Congress of 1878.

ISMAILIA, ēs′mȧ-ē′lē-ȧ. A village of Africa. See Gondokoro.

ISMAILIA. A town in the Isthmus of Suez, on the Suez Canal.

ISMAILIANS, ēs′mȧ-ē′lĭ-*a*nz. See Mohammedan Sects.

ISMAIL PASHA, ēs′mȧ-ēl′ pȧ-shä′ (1830–95). Viceroy and Khedive of Egypt. He was the second son of Ibrahim Pasha (q.v.) and was born at Cairo, Dec. 31, 1830. He was educated in Paris and on his return to Egypt was dispatched on diplomatic missions to several European capitals. Subsequently he was appointed Regent by his uncle, Said Pasha, during his absence in Europe. In 1861 he was placed in command of the army and carried on a victorious campaign against the Sudanese tribes. On the death of Said Pasha in 1863 he succeeded him as Viceroy of Egypt. During the Civil War in America he acquired vast wealth by the production of cotton. Regarding the construction of the Suez Canal (begun under Said Pasha) as advantageous for Egypt, he actively encouraged the enterprise. In 1866 he secured from the Sultan the hereditary succession to the throne of Egypt in his direct line, and in 1867 he received the title of Khedive. Not satisfied with these privileges, he demanded more, threatening to withdraw the troops he had sent against the Cretan insurgents and to seize Crete if his demands were refused. By the advice of foreign Powers he recalled his demand. Nevertheless, by extending his rule over the regions of the upper Nile, by making foreign loans for the increase of his army and navy, and by proposing the neutralization of the Suez Canal, he made himself practically an independent sovereign. The Sultan commanded him to reduce his army, to recall his orders for ironclads and breechloaders, and to put a stop to the contraction of foreign loans, threatening him with deposition if he refused. Not receiving the expected aid from Russia and other Powers, Ismail submitted. Later he received new prerogatives, giving him control of his army and liberty to make loans and commercial treaties. By the building of public roads, the introduction of new methods of agriculture, and other innovations he endeavored to improve the economic condition of the country and to civilize the surrounding tribes. But the progressive measures of the Khedive were accompanied by a reckless extravagance which involved the country to the limit of its resources and made it dependent upon the great financial Powers. In 1879 the governments of France and England, in view of the wretched economic condition of Egypt and the large interests of their own citizens in the administration, determined to interfere in behalf of good government and united in demanding of the Porte that the Khedive should commit the portfolios of Finance and Public Works to English and French ministers. The Khedive resented any interference of the Western Powers with Egyptian affairs. The Sultan then offered to depose Ismail Pasha and to appoint Halim Pasha, Ismail's uncle, as his successor; but the Powers advised the Khedive to abdicate, promising to support his son Tewfik. The Sultan acquiesced in the course recommended, and on June 26, 1879, he signed the firman deposing the Khedive in favor of his son Prince Mohammed Tewfik. Ismail at once complied with the demand, and his son was proclaimed Khedive as Tewfik I. Ismail received an annual allowance of £50,000 and left Egypt for Naples. In 1888 he took up his residence in Constantinople, where he died March 2, 1895. See Egypt.

ISMENE, ĭs-mē′nē (Lat., from Gk. Ἰσμήνη). In Greek mythology, the daughter of Œdipus and Jocasta and sister of Antigone (q.v.). In character she is a sharp contrast to her sister —strong, indeed, to suffer, but not fitted for bold deeds.

ISMID, ĭs-mēd′, or **IZMID**, ĭz-mēd′. The modern name of Nicomedia (q.v.).

ISNARD, ēs′når′, Maximin (1758–1830). A French Revolutionist, born at Grasse. In 1791 he was deputy from Var to the National Assembly, in which he distinguished himself by his boldness and eloquence. He was reëlected in 1792 and was instrumental in forming the Committee of Public Safety. He joined the Girondists and was arrested in June, 1793, but escaped and concealed himself until the fall of Robespierre. He appeared again in the Assembly and afterward was a member of the Council of Five Hundred. From a violent radical he developed into an advocate of the coronation of Napoleon (see his *Réflexions relatives au sénatus-consulte du 28 floréal, an XII*, 1804) and served the Restoration so faithfully that he was pardoned (1816) for having voted for the death of Louis XVI.

ISOBAROMETRIC (ī′sō-băr′ō-mĕt′rĭk) **LINES** (from Gk. *ἴσος, isos*, equal + Eng. *barometric*, from Gk. *βάρος, baros*, weight + *μέτρον, metron*, measure), or Isobars. Lines joining the places at which the atmospheric pressure reduced to a common level is the same. Ordinarily the weather maps show the isobars for sea level, and by recent decisions of the International Meteorological Congress the barometric indications must also be corrected for the influence of the variations of gravity so that atmospheric pressures may all be expressed in uniform absolute measures. Formerly meteorologists avoided the troubles and uncertainties of the reduction to sea level by using the departures of individual barometric readings from the normal reading of the instrument. These isabnormal lines were then plausibly converted into isobarometric lines by assuming that the normal pressure at sea level was everywhere the same, viz., 760 millimeters or 30 inches, and adding the departures from the normal algebraically to this assumed normal. The resulting pressures were assumed to represent closely the result that would have been given by reduction to sea level. In 1857 Ferrel showed that the normal barometric pressure at sea level could not possibly be uniform, but must be lower in the polar and higher in the tropical regions. In 1868 Buchan showed that the pressures are higher over the continents in the winter and over the oceans in the summer. Since these dates the importance of correct isobars based upon a correct method of reduction to sea level has been more and more thoroughly appreciated.

The term "isobarometric" was applied by Kaemtz, about 1830, to lines representing the oscillations of the barometer or its range from maximum to minimum during any month or year, but this usage is now obsolete. These oscillations are greatest in regions subject to the passage of severe and numerous storms. They are greater in the northern portion of the Atlantic Ocean than in the southern portion or in corresponding latitudes on land.

The distance between two neighboring isobars is greater in proportion as the winds are less, and vice versa the distance is small when the winds are strongest. The rate of change of pressure in a unit of horizontal distance is called the gradient of pressure. This barometric gradient may be as large as 5 millimeters or 0.25 inch of barometric pressure per degree of a great circle when gales of wind prevail, and much greater in the narrow region around a storm centre within which hurricane winds prevail. The barometric gradients attending storm winds must not be considered as producing the winds. On the contrary the winds have a great influence in producing the gradients, and much steeper ones would occur if the resistances to the motion of the wind did not prevent. See Meteorology.

IS′OBEL. An opera by Mascagni (q.v.), first produced in Buenos Aires, June 2, 1911; in Italy, Jan. 20, 1912 (Milan and Venice simultaneously).

I′SOBU′TANE. See Butane and Isobutane.

ISOCHEIMENAL (ī′sō-kī′mē-n*a*l) **LINES.** Lines that connect places having the same winter temperature. See Isothermal Lines.

ISOCHRONISM, ī-sŏk′rō-nĭz′m (from *isochronous*, from Gk. *ἰσόχρονος, isochronos*, equal in time, from *ἴσος, isos*, equal + *χρόνος, chronos*, time). A pendulum is isochronous when its vibrations are performed in equal times, whether these vibrations be large or small; and it can possess this property by being constrained to move in a cycloidal arc. (See Cycloid.) Huygens, who is believed to have first applied the pendulum to clocks (see Clock), made his pendulum isochronous by causing its string to wrap and unwrap itself round two equal cycloidal cheeks, the diameter of whose generating circle was equal to half the length of the pendulum. This device is no longer used, however, and isochronism is closely approximated in practice by causing the pendulum to describe a very small circular arc. The term is also used in connection with the balance of watches.

ISOCHRONOUS (ī-sŏk′rō-nŭs) **CURVE.** See Cycloid.

ISOCLINIC, ī′sō-klĭn′ĭc (from Gk. *ἴσος, isos*, equal + *κλίνειν, klinein*, to incline), or Isoclinal Line. A line supposed drawn on the earth's surface connecting the points at which the dip of a magnetic needle, or the magnetic inclination (q.v.), is the same. (See Terrestrial Magnetism.) The isoclinic lines, or lines of equal magnetic inclination (q.v.), may be said to run roughly east and west. They encircle two points, one in the Northern Hemisphere and the other in the Southern, at which the magnetic inclination, or dip, is 90°. These points are defined as the "magnetic poles"; their approximate positions in 1914 were lat. 70° N., long. 97° W., and lat. 72° S., long. 153° E. There are also so-called "local magnetic poles" where, e.g., because of extraordinary local deposits of magnetic iron ore, the dip of the magnetic needle is 90°; the area of influence due to such poles is generally very restricted. The aclinic line, or line of no magnetic inclination, is usually called the "magnetic equator," as it separates the north magnetic hemisphere (where the north end of the dip needle points downward) from the south magnetic hemisphere (where the north end of the dip needle points above the horizon or the south end points downward). Owing to the secular changes of the earth's magnetism, the isoclinic lines and the magnetic poles change their positions with the lapse of time.

ISOCRATES, ī-sŏk′rȧ-tēz (Lat., from Gk. Ἰσοκράτης, *Isokratēs*) (436–338 B.C.). Though one of the 10 Attic orators of the Alexandrian Canon (see Canon Alexandrinus), Isocrates was rather a publicist and a pamphleteer than an orator. His long life, as De Quincey interestingly points out in his essay on *Style*, spans the century from Pericles to Alexander. In youth he was attached to the Socratic circle, and Plato in the *Phædrus* commends him, when he was still a youth, above other orators for a certain touch of philosophy that might lead to higher things. Elsewhere Plato seems to allude to him with irony as a rival teacher and the exponent of a competing ideal of culture. His first school, opened at Chios, was probably devoted to the professional rhetoric of the law courts, and he himself wrote forensic speeches, a few of which have been preserved. These, however, he was inclined to disavow in later days when his school at Athens came to represent (after 392 B.C.) what he regarded as the more broad and liberal training in essay writing and epideictic (display) oratory on large political and Hellenic themes. From personal participation in the combats of the law courts or the assembly he was shut out by a weak voice and an invincible timidity, though he seems not to have been lacking in moral courage. Isocrates stands for three things: 1. The idea that the Greeks should unite to conquer Persia. This is set forth in his most brilliant performance, the *Panegyricus*, which cost him 10 years and is supposed to have been published at Olympia in 380 B.C. Failing to influence Athens and Sparta, he appealed to individuals—Jason of Pheræ, the tyrant Dionysius, Philip of Macedon. The legend consecrated by Milton's sonnet that the "dishonest victory at Chæronea, fatal to liberty, killed with report that old man eloquent," is sufficiently refuted by the tone of the letter to Philip. Indeed, the conquest of Asia by Alexander, though not accomplished by a union of Athens and Sparta, was in many ways a striking fulfillment of the prophecies of the *Panegyricus*. 2. Isocrates' ideal of culture as a faculty of elegant disquisition occupying the happy mean between the narrow utilitarianism of the advocate and the unprofitable subtleties of a Plato is to us, as exemplified in his writings, a ridiculous and platitudinous thing. But nevertheless his school did as much as the Academy of Plato to make the Athens of the fourth century the schoolmistress of Greece. Dissertations have been written about his pupils. Among them were the historians Ephorus and Theopompus, and the orators Isæus, Lycurgus, and Hyperides. From that school, says Cicero, as from the Trojan horse, a company of naught but chieftains issued forth. 3. Isocrates, though not himself a great writer, holds a great place in the evolution of European prose. He was a pupil of the brilliant Sophist Gorgias (q.v.), who freely employed as ornaments of prose jingling assonance, alliteration, balanced antithesis of thought and expression, striking metaphor, and other rhetorical features of Greek poetry. Isocrates tempered the excess of these "Gorgian figures," but retained them so far as consonant with the genius of ornate but not extravagant prose. He also practiced and taught the smooth organic structure of the long rhythmical period, the avoidance of hiatus, the conscious variation of phrase and selection of synonym. These and many other traits of style employed by him in a mechanical and monotonous way were studied in him by the world's three great masters of prose—Plato, Demosthenes, and, later, Cicero. And Cicero has made them the common property of all educated men in theory if not in practice.

Isocrates' 21 orations and 10 possibly genuine letters fill two small volumes of the Teubner texts. They have been partly translated into English by Freese, part i (London, 1894). They are not entirely free from dullness. There is an ample analysis and account of all of them in R. C. Jebb, *Attic Orators*, vol. ii (London, 1876). Consult also: F. W. Blass, *Attische Beredsamkeit* (Leipzig, 1868–80; 2d ed., 1887–93); id., *Die Rhythmen der attischen Kunstprosa* (Leipzig, 1901); W. C. Wright, *A Short History of Greek Literature* (New York, 1907); Adams, "Recent Views of the Political Influence of Isocrates," in *Classical Philology*, vol. vii (Chicago, 1912); H. M. Hubbell, *The Influence of Isocrates on Cicero, Dionysius, and Aristides* (New Haven, 1913). There is a good English annotated edition of the *Panegyricus* by Sandys, and selected orations have been edited with German notes by Schneider (Berlin, 1888).

I′SODIMOR′PHOUS SERIES. See Isomorphism.

ISODYNAMIC (ī′sō-dī-năm′ĭk) **LINES** (from Gk. ἰσοδύναμος, *isodynamos*, having equal power, from ἴσος, *isos*, equal + δύναμις, *dynamis*, power, from δύνασθαι, *dynasthai*, to be able). A line supposed drawn on the earth's surface connecting the points at which the intensity or strength of the earth's magnetic field has the same numerical value. There are three sets of these lines—the lines of equal horizontal intensity, the lines of equal vertical intensity, and, finally, the lines of equal total intensity. The first set show how the component (the horizontal one) of the earth's magnetic intensity acting on a compass needle varies from place to place; this component is a maximum in the equatorial regions and reduces to zero at the magnetic poles. The second set show how the component (the vertical one) acting on the dip needle varies over the earth, this component being zero along the magnetic equator (see Inclination) and increasing with approach to the magnetic poles. The third set map out the numerical values of the total intensity, the minimum values occurring in the equatorial regions and the maximum in the high northerly and southerly latitudes. Owing to the earth's complex magnetization, the maximum values of the vertical and of the total intensity are not found at the magnetic poles. All three sets of lines are subject to change with the lapse of years. See Terrestrial Magnetism; Isoclinic.

ISOGAMY, ī-sŏg′ȧ-mĭ (from Gk. ἴσος, *isos*, equal + γάμος, *gamos*, marriage). A condition in plants in which the pairing sex cells (gametes) are similar, i.e., they show no evident distinction into male and female. Only the lowest plants are isogamous. The contrasting term is heterogamy (q.v.). When gametes are recognized as male and female, this means that the former is a small and active cell, while the latter is a very large and passive cell. In isogamy, however, it must be realized that the two pairing gametes are physiologically unlike, or they would not pair. The real difference, therefore, is present in isogamy as well as in heterogamy. See Fertilization.

I′SOGE′OTHERMS. The name given to imaginary zones beneath the earth's surface passing through points of equal temperature.

ISOGONIC (ī′sȯ-gŏn′ĭk) **LINES** (from Gk. *ἴσος, isos*, equal + *γόνος, gonos*, angle), or Isogonal Line. A line supposed drawn on the earth's surface connecting the points at which the magnetic declination, or angle which the compass direction makes with the true meridian, is the same. The line of zero magnetic declination is called the *agonic line*. See Compass; Declination; Declinometer; Terrestrial Magnetism; Isoclinic.

ISOGONISM, ī-sŏg′ȯ-nĭzm. See Isomorphism.

I′SOGRAM (from Gk. *ἴσος, isos*, equal + *γράφειν, graphein*, to write). In mathematics, a diagram meant to show graphically a relation between three variables. Also a convenient name for all those lines used on charts and diagrams to connect points characterized by equality in some respect. Among the meteorological isograms may be mentioned isotherm, isobar, isabnormals, isohyet. Consult C. F. Talman, "Meteorological Isograms," in *Scientific American Supplement*, No. 1918 (New York, 1910). See Isopleths.

ISOLA BELLA, ē′zȯ-lȧ bĕl′lȧ. One of the Borromean Islands (q.v.) in Lago Maggiore (q.v.), Italy.

ISOLA DEL LIRI, dĕl lē′rē. A city in the Province of Caserta, Italy, 96 miles northwest of Naples, on the rivers Liri (Liris) and Fibreno (Fibrenus), which furnish power for paper, carpet, cloth, and woolen factories and for machine works. As the name indicates, the main town is on an island in the Liri, which has magnificent waterfalls 80 feet high. Half a mile beyond the picturesque estate of M. Lefebvre, afterward the Count of Balsorano, are the twelfth-century church of San Domenico, about three-quarters of a mile north of Isola, and the tenth-century monastery where Gregory VII was once a monk. The former is supposed to rest on the site of a villa of Cicero, called Arpinas, and the Isola San Paolo is believed to be the Insula Arpinas, where the orator was born. (See Arpino.) For a description of the villa and its neighborhood, see Cicero, *De Legibus*, ii, 3; the villa was supposed to be the scene of the dialogue *De Legibus*. Five miles west of Isola del Liri is the thirteenth-century abbey of Santi Giovanni e Paolo di Casamari, now state property. As an example of early Gothic it is rivaled in Italy only by the convent of Fossanova in Sonnino (q.v.). The name Casamari, attached to a place about 5 miles west of Isola, preserves the memory of the birthplace of Marius (q.v.). Isola has stone quarries and is lighted by electricity. Pop. (commune), 1901, 8202; 1911, 8416.

ISOLA GROSSA, grôs′sȧ. A long and narrow island off the coast of Dalmatia, Austria. Area, 35 square miles (Map: Austria, D 5). It is poorly watered, but nevertheless produces southern fruits, such as grapes, olives, and figs; it has also important fisheries. Pop., about 4000, mostly Croats. Its chief town, Sale, has a harbor, a lighthouse, and a population of 846.

ISOLA MADRE, mä′drȧ. One of the Borromean Islands (q.v.) in Lago Maggiore (q.v.), Italy.

ISOLANI, ē′sȯ-lä′nē, Johann Ludwig Hektor, Count (1586–1640). An Imperial cavalry general in the Thirty Years' War, born at Görz, of a noble Cypriot family. He was taken prisoner by the Turks in 1602, and after his escape became commander of a regiment of Croats and fought against Mansfield. In 1632 he was put in command of all the Croatian forces; two years later he was made Count, after deserting Wallenstein, who had treated him well. A clever leader of light cavalry and a terrible raider, Isolani fought in Picardy and Burgundy (1636), then in Hesse, Pomerania, and along the upper Rhine (1639) against Guébriant.

ISOLATION, ī′sȯ-lā′shŭn *or* ĭs′ȯ-lā′shŭn (from *isolate*, from Fr. *isoler*, It. *isolare*, from ML. *insulare*, to separate, from Lat. *insula*, island, from *in*, in + *salum*, sea, Gk. *σάλος, salos*, surge). In evolution, the separation or segregation of any assemblage of plants or animals in a limited area, so that the incipient varieties or species are prevented from breeding with those of adjoining regions. Through such isolation the leveling effects of free crossing or mixing with allied varieties are prevented. Thus variations or nascent species become localized, with the result that there are many thousands of local races, varieties, and species.

Besides geographical isolation there are other kinds of segregation. Darwin suggested two forms: (1) arising from organisms breeding at slightly different seasons; (2) "from varieties of the same kind preferring to pair together." To the first of these may be added the inbreeding of butterflies of two different broods, a part of one brood being belated and flying with their "nephews and nieces." See Digoneutism.

Lamarck was the first to broach the subject of the doctrine of isolation as a factor in species making in referring to man. Considering organisms in general, he points out that in reproductive unions the crossings between the individuals which have different qualities or forms are necessarily opposed to the continuous propagation of these qualities and their forms. He then instances man and says that, if distance of habitation did not separate men, the intermixture by generation would cause the general characteristics distinguishing different nations to disappear. Wagner (1868) has fully proved by numerous examples the importance of migration and isolation in species making. See Migration, Wagner's Law of.

As a result of 15 years' collecting in the Hawaiian Islands of land shells belonging mostly to genera found nowhere else, Gulick established the fact that in each mountain valley of the forest region of Oahu there is a great number of local species (200, represented by 700 or 800 varieties) belonging to several genera, and that each of the 20 valleys contains one or more local varieties or species restricted to that valley. On tracing this wonderfully differentiated assembly from valley to valley it became apparent that a slight variation in the occupants of a valley as compared with those of the adjacent valley becomes more pronounced in the next or third valley, still more in the fourth, and so on. Thus he was able roughly to estimate the amount of divergence between the occupants of any two given valleys by measuring the number of miles between them (Romanes). Gulick thinks the evolution of these different forms cannot be attributed to differences in their external conditions. The forest area, covering one of the mountain ranges, in which the snails live, is about 40 miles long and 5 or 6 miles wide. He states that the rainfall on the northeast side of the mountain is somewhat heavier than on the opposite side, and the higher ridges of the mountains are cooler than the valleys, but the valleys on one side of the range have a climate the same in every respect. The vegetation in the valleys differs somewhat from that on the ridges, but the vegetation of the different valleys is much the same—the birds, insects, and larger animals are the same. Though, as far as we can observe, the conditions are the same in the valleys on one side of the range, each has a molluscan fauna differing in some degree from that of any other. He also adds that a genus is represented in several successive valleys by allied species, sometimes feeding on the same, sometimes on different plants. In every such case it appeared that the valleys that are nearest to each other furnish the most nearly allied forms, and a full set of the varieties of each species presents a minute gradation of forms between the more divergent types found in the more widely separated localities. After giving reasons for the belief that this variation is not due to differences in their external conditions, Gulick concludes that the difference is due to a corresponding difference in the time of separation of each variety, and also to what he terms "cumulative segregation," "segregate breeding," and "independent generation." In his interesting essay on *Physiological Selection* (1886 and 1897), Romanes states that the essence of the principle consists in *all* cases of the diversifying *effect* of cross-infertility, whensoever and howsoever it may happen in particular cases to have been caused. (See Physiological Selection.) It is to be observed that this is but little different from Gulick's "cumulative" or "intensive" segregation. See Evolution, *Factors of Evolution;* Classification of Animals, *Species*.

After all the careful work done by Gulick it is yet to be doubted whether the chief or initial factors in the wonderful specialization which has taken place in the land shells of Oahu are not the result of migration into new regions, varying in natural conditions. For the present, then, Wagner's factors of migration into areas with differing conditions of life and isolation, and the consequent prevention of intercrossing with the original or parent forms, may be accepted as the essential causes of the origin of perhaps two-thirds to one-half of existing as well as extinct species.

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ISOLD, ISOLDE, ĭ-sōld′, **ISOND,** ĭ-sŏnd′, **ISOUD,** ĭ-so͞od′. See Iseult.

ISOMAGNETIC (ī′sô-măg-nĕt′ĭk) **LINES** (from Gk. *ἴσος, isos*, equal + *μάγνης, magnēs*, loadstone). A generic term in terrestrial magnetism for the class of lines supposed drawn on the earth's surface connecting the points at which any particular magnetic element has the same numerical value. There are, thus, isogonies (lines of equal magnetic declination), isoclinics (lines of equal magnetic inclination), isodynamics (lines of equal horizontal intensity, lines of equal vertical intensity, and lines of equal total intensity). See Terrestrial Magnetism; Isoclinal; Isogonic Lines; Isodynamic Lines.

ISOMERISM, ī-sŏm′ēr-ĭz'm. See Chemistry; Valency; Carbon Compounds; Stereochemistry; Cyanic Acid; Allotropy.

ISOMETRIC PERSPECTIVE. A system of conventional projection by which all three dimensions are represented to scale in a single drawing. Vertical lines are drawn vertical, and the two systems of horizontal lines at right angles to each other of a vertical cube are represented by lines at a fixed inclination, usually 30° to the horizontal, and drawn to the same scale as the verticals, or sometimes to a special scale indicated in the margin. Lines in other than these three directions are laid off by their relations to these. The term *Isometric Projection* is often used instead of *Isometric Perspective* and is more strictly correct.

ISOMETRIC SYSTEM. See Crystallography, and Plate of Crystal Forms.

ISOMORPHISM, ī′sô-môr′fĭz'm (from *isomorphous*, from Gk. *ἴσος, isos*, equal + *μορφή, morphē*, form). The relationship existing between solid substances which are similar in their chemical composition and constitution, have similar crystalline forms, and are capable of forming homogeneous mixed crystals ("solid solutions"). A substance standing in an isomorphous relationship to another is capable of growing in a saturated solution of that other, the latter then forming a mantle around the first as a nucleus. Ostwald proposes to define the relationship between two isomorphous substances as the capacity of one to cause immediate crystallization in a *supersaturated* solution of another, just as a crystal of any substance is capable of causing its own supersaturated solution to crystallize immediately. It must, however, be observed that while the relationship of isomorphism certainly exists, our knowledge of its intimate nature is very vague, and neither of the above definitions gives adequate expression to all of the known facts. The ordinary carbonates of calcium (calcite), magnesium (magnesite), iron (siderite), manganese (rhodochrosite), and zinc (smithsonite), all form crystals of the same crystal system and for the most part of the same crystal class (see Crystallography); and, further, their corresponding interfacial angles approach to the same values. Not all substances closely related in their chemical composition are isomorphous, and, exceptionally, substances which have no chemical relationship have similar symmetry of crystals and angles in close correspondence. (Such an accidental resemblance of the crystal forms of chemically unrelated substances is described as isogonism.) In the case of salts the chemical component which seems mainly to condition the symmetry of the molecule is the acid radical, the metal having less influence upon the crystal's symmetry, though affecting the size of crystal angles. (See Morphotropism.) The metals of a series of isomorphous salts are said to be isomorphous elements, and it is found that for the most part they are of the same or related groups of elements. See Periodic Law.

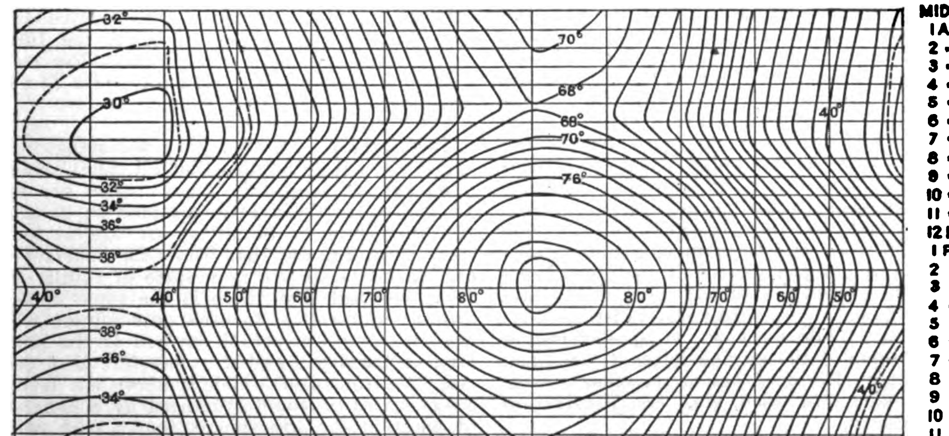
When a substance has been found to form crystals of more than one kind, it is said to be dimorphous, trimorphous, or polymorphous, the term "dimorphous" being used in a general sense to describe substances which exhibit three or more as well as two kinds of crystals. Sulphur crystallizes from fusion in long needle-like crystals of monoclinic symmetry, but from a solution in carbon bisulphide in orthorhombic crystals. Under other special conditions it assumes other kinds of symmetry. Carbonate of lime, which is generally found crystallized in nature as hexagonal (trigonal) crystals (calcite), is less frequently found in crystals of the orthorhombic system (aragonite) and with different physical properties from those of calcite. As explained above, calcite belongs in an isomorphous series with carbonate of magnesia, carbonate of iron, carbonate of zinc, etc. Aragonite, on the other hand, is a member of a different isomorphous group in which are carbonate of strontium, carbonate of barium, and carbonate of lead. A double group of this kind connected by a dimorphous substance (carbonate of lime as calcite and aragonite) is known as an isodimorphous group or series. See Crystallography; Chemistry; Atomic Weights.

ISOMURA, ē'sō-mōō'rȧ, Kittoku (fl. seventeenth century). A Japanese mathematician. His chief work was the *Ketsugi-shō*, which appeared in five books in 1660 and was again published in 1684. The work makes some attempt at integration and contains a number of very ingenious problems and some interesting examples of magic squares, magic circles, and sets of magic wheels. Consult Smith and Mikami, *History of Japanese Mathematics* (Chicago, 1914).

ISOND. See Iseult.

I'SOPER'IMET'RIC FIGURES (from Gk. *ἴσος, isos*, equal + *περίμετρον, perimetron*, perimeter, from *περί, peri*, around + *μέτρον, metron*, measure). Plane figures having equal perimeters. In the seventeenth century all problems which demanded the statement of a maximum or minimum property of functions were called isoperimetric problems. To the oldest problems of this kind belong especially those in which one curve with a maximum or minimum property was to be found from a class of curves of equal perimeters. That the circle, of all isoperimetric figures, gives the maximum area is said to have been known to Pythagoras. In the writings of Pappus a series of propositions relating to figures of equal perimeters is found. In the fourteenth century the Italian mathematicians also worked on problems of this kind. But Johann Bernoulli (1696) and Euler (1744) applied the calculus of variations to these problems, and Euler gave a purely analytic treatment in his celebrated work, *Methodus Inveniendi Lineas Curvas*. . . . This theory culminated in the calculus of variations, Lagrange supplying the appropriate notation. An illustration of problems of this class is that of Jakob Bernoulli—of all curves of the same length described on a given base, to determine one such that the area of a second curve, each of whose ordinates is a given function of the corresponding ordinate or arc of the first, may be a maximum or a minimum. See Maxima and Minima.

I'SOPLETHS (from Gk. *ἴσος, isos*, equal + *πλῆθος, plēthos*, number). These are curves connecting those points in a diagram which have the same numbers or values. This name might be logically applied to any isogram (q.v.), as it is a synonymous word. In practice it is restricted to the lines drawn through points of equal value in a diagram made by inserting the proper value for any given element at the proper intersections of a coördinate net having hours along one axis (usually ordinates) and days of the year along the other axis (abscissæ). If the average temperatures for this net are prop-



THERMO-ISOPLETHS FOR WASHINGTON, D. C.
Degrees, Fahrenheit.

erly entered thereon, the lines connecting equal temperatures would be called *thermo-isopleths,* and they would present what may be regarded as a contoured topographic map of the temperature surfaces prevailing at the locality of observation (e.g., Washington, D. C.) throughout the average or "normal" year. The figure on the preceding page presents such a diagram for Washington, D. C.

The advantages of this graphic method for presenting any climatological element are that it furnishes very characteristic, comparable, graphic pictures of the same element in different localities; it permits one to seize at a glance the distribution of the element throughout the two ranges of time, or time and space, employed and the relation it bears to time and season; and it furnishes convenient graphic interpolations and comparisons between neighboring records of differing lengths. Similar constructions are very instructive in the study of hydrologic phenomena, and they have been very useful in revealing the process of the seasonal overturning of the waters of lakes and reservoirs.

Consult: Erk, "Ueber die Darstellung der stündlichen und jährlichen Vertheilung der Temperatur durch ein einziges Diagramm," in *Meteorologische Zeitschrift* (Berlin, 1885); Fassig, *Climate and Weather of Baltimore* (Baltimore, 1907); Cox, *Weather and Climate of Chicago* (Chicago, 1914); Hann, *Lehrbuch der Meteorologie* (Leipzig, 1914).

ISOP'ODA (Neo-Lat. nom. pl., from Gk. *ἴσος, isos,* equal + *πούς, pous,* foot). An order of malacostracous crustaceans of the section Arthrostraca, mostly aquatic—some marine, some inhabitants of fresh waters—but some terrestrial, inhabiting damp places, as the wood louse and the like. They are easily recognized by the fact that the body is flattened dorsoventrally, and many of them—e.g., the sow bug or pill bug (*Porcellio*)—have the habit of rolling up into a ball with the head tucked safely inward. The first segment of the thorax is fused with the head, but the remaining seven are free and bear limblike appendages without gills. In females the basal joints of several of these appendages bear lamellæ, which form a brood pouch for the eggs. There is never any carapace. The maxillipeds, of which there is only a single pair, usually fuse to form a sort of lower lip. The abdominal appendages are biramose and serve for swimming and breathing; the most anterior pair are usually thick and form an operculum which serves to protect the more delicate appendages behind. The heart is situated chiefly in the abdomen, but extends forward a short distance into the thorax. While most of the species lead a free life, some of the marine forms (*Cymothoa,* etc.) are parasitic on fishes or on other crustaceans, or bore into wood, etc. See Illustration under GRIBBLE.

One group (Bopyridæ) are parasitic, living under the carapace of various shrimps. The females of *Bopyrus palæmoneticola* (Packard) are many times larger than the males and are much degenerated, the head being without eyes and appendages; they retain their position on their host by means of the sharp, hooklike legs around the edge of the body. The male in general appearance shows but slight modifications and is about one-fifth as large as the female, and is lodged partly out of sight under the ventral plates of its consort.

Some of these forms are notably degenerate. The Isopoda are a comparatively small group and are generally small individuals, few species reaching a length of 1 inch, except in the colossal deep-sea *Bathynomus giganteus,* dredged in the Caribbean Sea from a depth of nearly a mile. The colors are usually dull, blackish, gray, or brown; but some of the marine forms are highly colored, red or brown, according to the hue of the seaweed they rest on.

Fossil isopods, though of little geological importance, are known from rocks as early as the Upper Devonian and Carboniferous; also from the Jurassic limestones of Bavaria and other Mesozoic formations. Most of them have some superficial resemblance to the marine *Sphæroma* and to the terrestrial wood lice of modern time. See CRUSTACEA.

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I'SOQUIN'OLINE. See QUINOLINE.

ISOSPONDYLI, ī'sō-spŏn'dĭ-lī (Neo-Lat. nom. pl., from Gk. *ἴσος, isos,* equal + *σπόνδυλος, spondylos,* vertebra). An order of teleost fishes, the soft-rayed fishes. They have the anterior vertebræ simple, unmodified; the mesocoracoid arch is always well developed, and the strong shoulder girdle is connected with the cranium. There are no auditory ossicles. The scales usually are cycloid, the ventral fins abdominal. It is a large group, comprising the tarpons, ladyfishes, herrings, shads, sardines, anchovies, menhadens, salmons, trouts, whitefishes, and related families, and, in the opinion of some, the Iniomi (q.v.) also. Consult Jordan and Evermann, *Fishes of Northern and Middle America* (4 vols., Washington, 1896–1900).

ISOS'PORY. See HOMOSPORY.

ISOS'TASY. A theory of the structure of the earth that postulates that all equal areas in a surface at a certain depth below sea level (found by geodetic investigations to be about 122 kilometers, or 76 miles) are subject to the same pressure, and that below that surface the earth's materials are in a state of equilibrium. It is assumed that there is the same mass or amount of material in each unit column which extends from the actual surface of the sea or land to the depth stated. Therefore that material of a continent which is above sea level is compensated or counterbalanced by a deficiency of mass in the lithosphere (outer part of the earth) below it, while the deficiency of mass in the space occupied by the water of the oceans is counterbalanced by an excess of matter in the lithosphere under the ocean. The condition of isostasy obtains because of the yielding of the earth's materials to long-continued strains, though they may be rigid or unyielding to stress differences acting for a short time only.

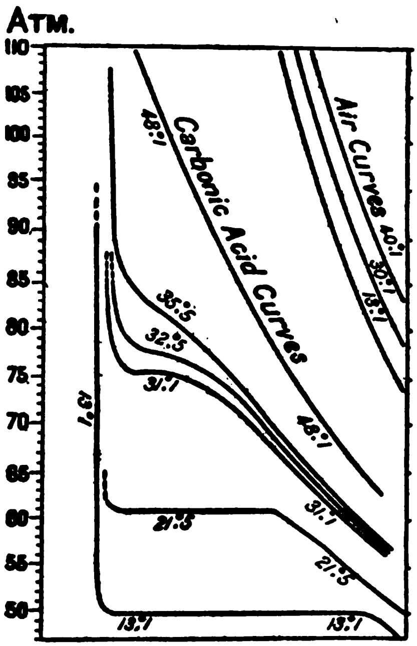
The great inequalities of elevation between the continental lands and the oceanic basins, according to this theory, are maintained not so much by rigidity of the rock materials as because of differences in density—the projecting land areas being composed of lighter materials than the depressed sea bottoms. The mountain masses which rise 15,000 feet or more above sea level are buoyed or floated, as it were, on the substratum. From a geological standpoint the most important consequence involved is that any change of load upon one part of the crust finds compensation by a movement in the substratum from the area of increased pressure towards that of diminished pressure. Thus, elevated regions which are being eroded and worn down at the surface tend to rise, while the oceanic depressions which receive the weight of sediment gradually sink. The shifting or movement of the underlying material affords an explanation for the crumbling and folding of rocks. The principle of isostasy, as explained by Dutton, has received strong support recently from the series of investigations made by the United States Coast and Geodetic Survey under Hayford. Measurements of the force of gravity at widely distributed stations show actual variations of density that, on the whole, conform with it.

Consult: J. F. Hayford, *Figure of the Earth and Isostasy from Measurements in the United States* (Washington, 1909); id., *Supplementary Investigation in 1909 of the Figure of the Earth and Isostasy* (ib., 1910); Hayford and Bowie, *Effect of Topography and Isostatic Compensation upon the Intensity of Gravity* (ib., 1912); and other publications of the United States Coast and Geodetic Survey. See Deflection of the Plumb Line; Geodesy.

ISOTELUS (ī-sŏt′ē-lŭs) **DEKAY.** A genus of trilobites belonging to the Asaphidæ and for a time considered as identical with *Asaphus* (q.v.), but distinguished from it by the smooth cephalon and pygidium, with depressed borders. Some species attain such great size that they belong to the giants among the trilobites. The most common American forms are *Isotelus gigas* and *Isotelus maximus*. The former has become widely distributed in museums, the specimens coming from the Trenton limestone at Trenton Falls, N. Y. The genus occurs abundantly in the Ordovician rocks of America, but is rare in Europe.

ISOTHERAL (ī-sŏth′ẽr-al) **LINES,** or **ISOTHERÆ,** ī-sŏth′ẽr-ē (from Gk. *ἴσος, isos,* equal + *θέρος, theros,* summer). Lines that connect together places that have the same mean summer temperature.

ISOTHERMAL, ī′sō-thẽr′mal (from Gk. *ἴσος, isos,* equal + *θέρμη, thermē,* heat). In physics, an isothermal is a line drawn on any diagram so as to represent the successive values of the properties of a body as it undergoes certain changes, the temperature being kept constant. Thus, if the properties of the body which are to be observed and noted are its pressure and volume, the isothermal curves are drawn on a diagram having pressure and volume as ordinates and abscissæ. The isothermals of a typical substance, carbonic-acid gas, CO_2, in the form of vapor and liquid, are given in the accompanying figure. Considering any of the lower curves—i.e., the isothermals for temperatures less than 31° C.—it is seen to consist of three parts: the nearly vertical portion is the isothermal for the liquid; the horizontal portion, for the process of evaporation of the liquid, when the liquid occupies the lower portion of the containing vessel and the vapor the upper; the curve at the right, which is nearly an hyperbola, is for the vapor after all the liquid has evaporated. The isothermals for temperatures higher than 31° C. do not have any horizontal portion, showing that as the gaseous substance is compressed at these temperatures it never condenses and becomes a liquid—if it did condense, the curve would become horizontal, because when the temperature is kept constant the pressure of the condensing vapor does not change. (See Heat.) Therefore, if the gas is to be liquefied, it must be at a temperature lower than 31° C.—i.e., lower than the temperature corresponding to the first isothermal which does not have a horizontal portion. This temperature is called the "critical" temperature.



It is evident that, if the vapor at any temperature higher than the critical one is compressed, the temperature being kept constant, its volume may be made very small; and if its temperature be now lowered below the critical value, thus making its volume less, it may become a liquid. But in the actual experiment it would be impossible to tell when the change took place, because the vessel containing the vapor (or liquid) is *full* all the time. Not until, by a suitable increase in volume, the condition of the matter is given by a point on the horizontal portion of the isothermal, can one tell by observation that there is liquid in the vessel, for then one can see the surface of the liquid.

ISOTHERMAL LINES, or Isotherms. In meteorology, lines that connect places having the same temperature for a day, month, or for any given interval of time. Systems of isothermal lines for daily maps, as well as for monthly and annual means, present in a very graphic manner the prevailing temperature conditions and are therefore of universal use in meteorology. They seem to have been first used by Alexander von Humboldt in 1817; but lines of equal departure from normal values were independently used by Brands in his studies of the daily weather map and the storms of Europe. Isothermal lines coincide only accidentally, if at all, with small circles of latitude, owing to the great influence of the distribution of land and water on the temperature of the air. The temperatures observed at the respective stations must be corrected or reduced to the standard level surface of the globe, in order that they may be comparable with each other. This reduction introduces discrepancies, but there are many reasons for retaining it. The rate of reduction adopted by Hann and other climatologists is 0.50° C. per 100 meters, or 1° F. for 370 feet. If a chart has been constructed using this rate of reduction, and one should desire to know the temperature at the top of a mountain, whose altitude is given, we have but to read from the chart the temperature at sea level, apply the reduction to the given altitude, and get at once approximately the temperature of the summit. The accuracy of this method is, however, limited by the fact that the rate of diminution of temperature varies so much that the adoption of an average rate is liable to lead us astray. Charts of isotherms for each month of the year and for the whole globe have been constructed, first by Buchan, and afterward by the United States Weather Bureau, and were published in full in 1900 in elegant style in Bartholomew's *Physical Atlas*.

Isothermal lines can be calculated and drawn for the upper levels of the atmosphere by using observations on mountain tops and in balloons and kites. Lines of this character were first drawn by Hergesell for Europe for certain days in 1898–1900, on which sufficient data were collected by means of balloons and kites. These lines show that large variations in temperature occur at the highest attainable levels, and that the atmosphere in general is a mixture of masses of descending cold air and ascending warm air. See charts under Temperature, Terrestrial; and Distribution of Animals; also articles Climate; Distribution of Animals; Isopleths; Meteorology.

ISOUARD, ē'zōō'är', Niccolò, known as Niccolò de Malte in France (1775–1818). An Italian composer and musician, born in Malta. He was educated for the navy and afterward entered commercial life; but meanwhile he studied the piano under Pin in Paris, and harmony under Vella and Azopardi in Malta. Later, while in Italy, he received further instruction from Amendola, Sala, and Guglielmi. In 1795 he produced his first opera, *L'Avviso ai maritati*. The reputation gained by several works of the kind obtained for him the position of chapel-master to the Order of St. John of Jerusalem in Malta. In 1798 he went to Paris and met there Rodolphe Kreutzer, who collaborated with him in two of his operas. One of his first successes was *Michel-Ange* (1802). He also became known as a pianist. He wrote for the Opéra Comique until Boieldieu's growing popularity, and the election in 1817 of that composer to the Academy, an honor which Isouard coveted, caused him to abandon himself to dissipation. The next year he died of consumption. He had much dramatic tact; his music is always simple and gay, never trivial or vulgar, and he had the excellent librettos of Hoffmann and Etienne to work upon. Of his 33 operas, the following are the best known: *Le médecin turc* (1803); *L'Intrigue aux fenêtres* (1805); *Cendrillon* (1810); *Le siège de Mézières*, with Cherubini, Catel, and Boieldieu (1814); *Joconde* (1814); *Jeannot et Colin* (1814); and *Aladin, ou la lampe merveilleuse*, completed by Benincori (1822).

ISOUD. See Iseult.

ISPAHAN, ĭs'pȧ-hän', or **ISFAHAN**. The former capital and one of the largest cities of Persia, situated on the Zendeh-rud (river), over 200 miles south of Teheran, the present capital (Map: Persia, D 6). The surrounding country is of remarkable natural beauty and presents a striking contrast to the half-ruined city. Only a small part of the area inclosed by the ancient and now ruined walls is inhabited, the remainder being a succession of ruined castles, mosques, and schools, which testify to the former splendor of the city. The centre of the city is occupied by a magnificent plaza laid out by Shah Abbas (1585–1628) and formerly surrounded by fine structures. Of the few buildings which have survived the ravages of time, the palace of Shah Abbas, known as Chehel Sutun, or Hall of Many Columns, is probably the finest. A row of 20 graceful cedar columns extends along the front portal, supporting a magnificently ornamented roof. Behind the columns is a spacious hall with mirror-covered walls and a fountain in the centre. Besides this hall there is a large room containing six large oil paintings depicting scenes from the life of Shah Abbas. On the southeastern side of the plaza stands the great mosque, Mesjid-i-Shah, erected in the beginning of the seventeenth century and presenting, even in its ruined state, a fine example of Eastern architecture. On the western side of the royal grounds is situated a magnificent palace known under the name of Hasht Behesht, or Eight Paradises, built by Shah Suleiman at the end of the seventeenth century. It is surrounded by beautiful gardens ornamented with fountains. On the western side is the mosque of Sheikh-Lutfallah, with its dome of enameled tiles, and at the northwestern end is the entrance to the extensive covered bazars of the city, which have a total length of over 2 miles. Another important monument is the school (medresseh) and caravansary of Mader-i-Shah Sultan Hussein, built by that Sultan 1700–10.

The Zendeh-rud, on which the town is situated, is crossed by five bridges, of which that of Allah Verdi Khan is especially remarkable, both for its size and for its architectural beauty; it is 388 yards long, with a paved roadway 30 feet broad. On the farther bank of the river is the graceful Mirror Pavilion (Aineh-Khavé), similar in style to the Chehel Sutun, but less extensive. Industrially Ispahan is still a town of some importance. Its chief products are silk, woolen and cotton goods, jewelry, arms, leather goods, and footwear. The town derives also considerable commercial importance from its position on the main route from Abushehr to Teheran. A little way south of Ispahan is situated the Armenian settlement of Julfa, which contains the entire European colony of Ispahan. It was founded in the beginning of the seventeenth century and at one time had an Armenian population of 30,000, which was reduced through persecution to about 2000. It has a number of Christian churches and several schools. Its population is estimated at upward of 80,000. It is said by Persian writers to have been founded by some of the Jews who were led into captivity by Nebuchadnezzar. It was a trading town of importance, and the capital of Irak, under the caliphs of Bagdad. It was taken by Timur in 1392, when 70,000 of the inhabitants are said to have been massacred. During the seventeenth century, under Shah Abbas the Great, it became the capital of Persia and reached the climax of its prosperity. It is said to have had between 600,000 and 1,000,000 inhabitants; the smaller figure is given by Jean Chardin (q.v.), who long lived at Ispahan. It was then the emporium of the Asiatic world; the merchandise of all nations enriched its bazars, and ambassadors from Europe and the East crowded its court. In 1722 it was devastated by the Afghans, and towards the close of that century the seat of government was transferred to Teheran (q.v.). Its commerce has greatly declined.

ISPICA, ē′spē-kȧ, Val d′. A valley in southeast Sicily, 5 miles southeast of Modica. It is 7 miles long and is famous for its grottoes, containing graves. In the fourth century, as numerous inscriptions show, these grottoes were used by Christians as tombs.

ISRAEL, ĭz′rā-ĕl. See Jacob.

ISRAEL, Kingdom of. See Jews.

ISRAEL IN EGYPT. An oratorio by Handel (q.v.), first produced in London, April 4, 1739; in the United States, Feb. 13, 1859 (Boston).

ISRAELITES, ĭz′rā-ĕl-īts. See Jews.

ISRAËLS, ēs′rä-ĕls′, Jozef (1824–1911). The foremost Dutch genre painter of the nineteenth century. He was born at Groningen, North Holland, Jan. 27, 1824, the son of a well-to-do Jewish merchant. Intended for a commercial career, he early showed a taste for art and was sent to Amsterdam, where he studied under Kruseman and Pieneman. He then spent three years in Paris, studying under Picot, and at the Ecole des Beaux-Arts under Delaroche, but frequenting the ateliers of various Romantic painters. In 1848 he returned to Amsterdam and for several years painted historical pictures which show no especial talent or individuality. His real style was not revealed until his return from Zandvoort, a fishing village near Haarlem, where he had gone for his health. There he realized for the first time the beauty of humble life, especially of the fisher folk; the tragic aspects of this life particularly impressed him. He continued to live principally at Amsterdam until he settled at The Hague in 1870. In 1862 his pictures "The Cradle" and "The Shipwrecked Mariner," exhibited in London, excited much interest. "The Cradle," with its intimate charm, and touch of agreeable sentimentality, was typical of many of the interiors, both in oil and water color, that he executed afterward. An example of this later painting is "Expectation," in the Metropolitan Museum of Art, New York. It is a moving, homely picture of the genre he made famous by "Interior of the Orphan Asylum at Katwijk" (1867); "The Frugal Meal," Vanderbilt collection (Metropolitan Museum, New York); "A Dutch Interior," Walters collection, Baltimore; "The Silent House," Glasgow Museum; "An Interior," Dordrecht Gallery; "Alone in the World," Rijks-Museum, Amsterdam (another version in Mesdag Museum, The Hague); "A Son of God's People," Municipal Museum, Amsterdam; "Before Parting"; "Through Darkness to Light"; "David before Saul"; "Children of the Sea"; "When One Grows Old"; "The Jewish Scribe"; and many others. He also painted portraits of great power, among the best of which is one of himself (1908). He is best represented in various Dutch galleries, and many of his paintings are in the United States. As he grew older, his work gained in breadth and poetic power. The studies of fisher folk, by which he is equally well known, include the rather melodramatic "Shipwrecked Mariner"; "The Zandvoort Fisherman," in the Amsterdam Gallery; and his great canvas, "The Toilers of the Sea," which with "Between the Field and Seashore" and "The Bric-à-Brac Dealer," won medals of honor at the Paris Exposition of 1900. He received many other distinctions, was corresponding member of the French Institute and of nearly all the principal European academies. His treatment was increasingly broad and realistic, and his color, at first pronounced, was afterward modified with peculiar, misty atmospheric effects. Like Rembrandt, he was rather an artist in light and shade than a colorist, and a poet as well as a painter. He has often been compared with Millet, whom he resembles in subject as well as in a certain weakness in the purely technical sides of painting. Israëls excelled also in water color, and his etchings are notable for their simplicity and sureness of touch. He wrote a book of travels, *Spanien*, published in German translation at Berlin in 1900.

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ISRAFIL, ĭz′rā-fēl. The archangel of music, who, according to later Mohammedan belief, will sound the last trump on the day of resurrection, standing upon the rock of the temple at Jerusalem calling mankind to the last judgment. His playing will be one of the delights of paradise. The name does not occur either in the Koran or the Hadith (q.v.). He is, however, supposed by commentators to be the angel mentioned in Suras xx, 107, 1, 40, and liv, 6. Like much of the angelology of Mohammedanism, this represents a superstructure due to later Jewish and Christian influences.

ISSA, ĭs′ȧ. See Lissa.

ISSACHAR, ĭs′sȧ-kär. One of the tribes of Israel, descended, according to the Book of Genesis (xxx. 17), from Issachar, the ninth son of Jacob and fifth of Leah. The name is explained as meaning "there is reward" and is interpreted by a reference to the "mandrakes" with which Leah "hired" her husband from her sister Rachel (Gen. xxx. 16), or as Leah's reward for giving her handmaid Zilpah to Jacob (xxx. 18). The subject condition of the tribe at some period of its history (cf. Gen. xlix. 14–15) may have suggested the meaning of "hired laborer." The original significance of the tribal name was probably lost at an early time, and it may have been confounded with the name of some local divinity. The tribe's lot in Palestine included the Plain of Esdraelon, but the Canaanites were but imperfectly dispossessed. Deborah and Barak are supposed to have belonged to the tribe, also Baasha, third King of Israel (1 Kings xv. 27). The reference to Issachar in the blessing of Moses (Deut. xxxiii. 18–19), "they [Zebulon and Issachar] to their mountain nations call; they bring right sacrifices there," has been thought to refer to Tabor, where there probably was a sanctuary visited by various peoples from whom the tribe of Issachar at one time may have drawn considerable profit. Consult Nathaniel Schmidt, *Messages of the Poets*, pp. 346–347 (New York, 1911).

ISSACHAR. A character in Dryden's *Absalom and Achitophel.*

ISSI, ĭs'ī. See Issus.

ISSLAND, ĭs'lănd. In the Nibelungenlied (q.v.), the kingdom of Brunhilda.

ISSOI, ĭs'oi. See Issus.

ISSOUDUN, ē'sōō'düN'. The capital of an arrondissement in the Department of Indre, France, situated on the river Théolle, 22 miles southwest of Bourges (Map: France, N., G 6). It has a municipal college, a library, and a museum, the latter installed in an ancient building known as the White Tower. It has quarries of lithographic stone and manufactures textiles, bristles, parchment, and machinery. There are also several large breweries. The town dates from ante-Roman times, but it has preserved few ancient remains, as it has often been ravaged by wars and has been several times destroyed by fire. Pop., 1901, 14,222; 1911, 10,246.

ISSUE (OF. *issue, eissue, essue*, Fr. *issue*, from OF. *issir, eissir*, to go out, from Lat. *exire*, to go out, from *ex*, out + *ire*, to go). In legal procedure, the stage of an action when, in the course of pleading, the parties come to a direct conflict, i.e., a point which is affirmed by the one and denied by the other. The litigants are at issue. The term is also used to designate the point or question thus raised by the pleadings. In this sense the issue may be one either of law or of fact. If the former, it is decided by the court without the intervention of a jury; if the latter, it is, in the ordinary courts of common law, usually determined by a jury or, in equity practice, by a judge. In some of the States of the Union issues of both kinds may by consent of parties be tried by a referee. An issue of fact arises when a material matter of fact is asserted by one party and denied by the other. An issue of law arises when one party, admitting for the purposes of the issue that the facts alleged by his adversary are true, denies that they are sufficient in law to constitute a cause of action or a defense.

When a court of law or equity is sitting without a jury, it sometimes happens that a question of fact arises upon which the decision of a jury is desired. A fictitious suit is thereupon framed, involving the point in question, and brought to trial before a jury summoned for the purpose. The verdict rendered, being returned to the court, is accepted as a settlement of the issue of fact, and the trial of the cause out of which that issue grew thereupon proceeds. In some States a feigned issue in such cases is not required, the actual question as it arises being submitted to a jury specially impaneled by order of court. See General Issue; and consult the works referred to under Pleading.

ISSUE. In English and American law, the lineal (as distinguished from the collateral) descendants of a person. It comprehends grandchildren, etc., ad infinitum, as well as the immediate offspring, but does not include adoptive children. A devise of land to a person and "his issue" is deemed the equivalent of a gift to such person and "the heirs of his body" and results in the estate known as a fee tail (q.v.). The phrase "failure of issue" signifies an ultimate failure, as by the death of the last surviving lineal descendant, and, under the rules of interpretation of deeds and devises developed by the courts of common law and equity, the same signification attaches to the expression "if he shall die without issue." Thus, if lands are given to A and his heirs and, if A die without issue, to B and his heirs, the gift is regarded as vesting in B only upon a complete and final failure of A's issue, whenever this may happen. See Real Estate; and consult the authorities there cited.

IS'SUS, or **ISSI** (Lat., from Gk. 'Ισσός, 'Ισσοί, *Issos, Issoi*). An ancient seaport on a gulf of the same name (now the Gulf of Iskanderun) in Cilicia, Asia Minor. It possessed great strategic importance in ancient times on account of its position on the narrow defile leading from Syria into Cilicia (q.v.; see also Cilician Gates). At Issus, Alexander the Great overwhelmed Darius (333 B.C.). Near by, Septimius Severus overthrew Pescennius Niger, his rival for the Imperial throne (194 A.D.), and in the neighborhood the Emperor Heraclius defeated the Persians in 622 A.D. The exact site of Issus has not been determined. See Battle of Issus; Alexander the Great.

ISSY, ē'sē' (Fr. *Issy-les-Moulineaux*). A town in the French Department of Seine, situated about 1½ miles southwest of Paris, with which it is connected by a street railway, and on the left bank of the Seine (Map: France, N., A 2). It has a seminary, a museum, a castle, and a home for the aged. There are manufactures of silk, paint, oil, chemicals, cement, and shoes. The fortifications of Issy suffered considerably during the siege of Paris in 1870–71, but have since been restored. Pop., 1901, 16,639; 1911, 20,043.

ISSYK-KUL, ēs'sēk-kōōl'. A lake in the Province of Semiryechensk, Russia, lying to the south of Lake Balkash (Map: Asia, K 4). It is about 38 miles in width and 112 miles long, with an estimated area of over 2000 square miles, but rapidly being desiccated. It receives a number of small streams, and its water is brackish; its shores are low and sparsely inhabited. The chief settlement is Przhevalsk, situated on the east shore and named in honor of the famous explorer Przhevalsky.

ISTEL, ĭs'tel, Edgar (1880–). A German composer and writer on music, born at Mainz. He studied violin and composition under Fritz Volbach, at the same time attending the Gymnasium of his native town. After graduation in 1898 he went to Munich to complete his musical studies with L. Thuille and to enter the university, where he devoted himself to the science of music and to psychology, receiving the degree of Ph.D. in 1900. He wrote the operas *Der fahrende Schüler* (1906) and *Des Tribunals Gebot* (1914); a *Singspielouvertüre; Hymnus an Zeus* for chorus and orchestra; mixed choruses; and songs. His chief importance, however, rests upon his literary works, of which the following are the principal: *Peter*

Cornelius (1906); *Die Entstehung des deutschen Melodramas* (1906); *Die komische Oper* (1906); *Das Kunstwerk Richard Wagners* (1909); *Das Libretto* (1914).

IS'TER. The ancient name of the Danube in its lower course.

ISTHMIA, ĭs'mĭ-ȧ, or **ISTHMIAN GAMES.** See ISTHMUS.

ISTHMIAN CANALS. See NICARAGUA CANAL; PANAMA CANAL.

ISTHMIAN ODES (Gk. 'Ισθμιονίκαι, *Isthmionikai*, victors in the Isthmian Games). Poems of Pindar (q.v.) celebrating the victors in the Isthmian Games, for which see ISTHMUS.

ISTHMUS, ĭs'mŭs (Lat. *isthmus*, from Gk. *ἰσθμός*, *isthmos*, narrow neck of land between two seas). In geography, a narrow neck of land joining two portions of land. The name isthmus was by the ancients often employed without any addition to designate the Isthmus of Corinth, joining the Peloponnesus to continental Hellas. In the southeastern part of the isthmus was a sacred precinct containing temples of Poseidon and Palæmon-Melicertes, where were celebrated the Isthmian Games, one of the four great national festivals of Greece (see INO). According to legend, they were established by Poseidon or Sisyphus in honor of Melicertes (q.v.), or by Theseus after his victory over Sinis, in honor of Poseidon, a version which explained the right of the Athenians to the seats of honor at the Isthmian Games. The regular celebration of the games was dated from 582 B.C. The games seem to have been held every two years, in the spring of the second and fourth years of each Olympiad. The prizes were a palm branch and wreath of parsley during the Greek period, but under the Roman Empire a wreath of fir was substituted. The games were in charge of the Corinthians, and the contests seem to have been those usual at Olympia (see OLYMPIC GAMES), to which musical competitions were added later. After the fall of Corinth (146 B.C.) the Sicyonians continued the games, until the reëstablishment of Corinth by Julius Cæsar. The contests were open to all Greeks except the Eleans. The site of the games has been excavated by the French. Near the site of the isthmian sanctuary can be seen remains of the *Diolkos* or railway by which, in ancient times, small ships were transported across the isthmus; and somewhat to the north can be traced the ancient wall by which, at various times, the Peloponnesus was protected against invasion. The extant remains belong chiefly to the later Roman Empire or the period of Venetian rule. Consult: *Gazette archéologique*, vols. ix–x (Paris, 1884–85); 'Εφημερὶς 'Αρχαιολογική (Athens, 1884–85); the article "Isthmia" in Smith, *A Dictionary of Greek and Roman Antiquities*, vol. i (3d ed., London, 1890); Baedeker, *Greece* (4th Eng. ed., Leipzig, 1909). For the Isthmian Games, consult Gardiner, *Greek Athletic Sports and Festivals* (London, 1910). See CORINTH; CORINTH, GULF OF; CORINTH CANAL.

ISTIB, ē-stēp', or **SHTIPLIE**, shtĭp'lyĕ. A town of southeastern Servia, situated about 18 miles east of Köprili and 110 miles south of Nish (Map: Balkan Peninsula, D 4). It has a number of mosques and a fine bazar. Its trade is of considerable importance; the population is estimated at 13,000. For over four centuries it belonged to the Turkish Empire, being included in the Vilayet of Kossovo, but during the Balkan War (q.v.) it was captured by the Servians (October, 1912) and confirmed to them by the Treaty of Bucharest (Aug. 10, 1913).

ISTRIA, ĭs'trĭ-ȧ. An Austrian margraviate and crownland, forming part of the modern administrative district of Küstenland (Coastland) (Map: Austria-Hungary, C 4). It consists of a peninsula, the ancient Histria, projecting into the northeast part of the Adriatic Sea, and the islands of Veglia, Cherso, and a few others, covering a total area of 1913.6 square miles. The peninsula is bordered on the north by Triest, Görz and Gradisca, and Carniola, on the east by Fiume, Croatia, and the Bay of Quarnero, and on the south and west by the Adriatic. The peninsula has well-indented coasts and is traversed by a chain of rocky mountains from north to south, culminating in the peak of Monte Maggiore, nearly 4600 feet high. The shores are generally precipitous. The chief streams are the Arsa in the east and the Quieto in the west. The climate is very warm and dry. The severe winds along the coasts are greatly feared by the inhabitants. Istria has little land adapted for tillage, but its pasture lands are extensive as well as its forests. In 1910, out of a total of about 495,600 hectares, arable land amounted to about 55,900 hectares, gardens 14,500, vineyards 29,600, meadows, pastures, etc., 214,200, woodland 165,400, lakes and marsh 630, unproductive (untaxed) 15,300. The climate is favorable to the cultivation of southern fruits, such as olives and figs. Istria also produces an excellent grape, and its wines are famous. Of mineral products it yields chiefly alum, lignite, and salt. The large forests furnish good material for ships, and shipbuilding is a very extensive industry. The sea fishing is also important. The manufacturing industries are as yet undeveloped. Owing to its numerous harbors, Istria is one of the most important commercial districts of Austria, and Pola, at the southern end of the peninsula, is the chief naval station of the monarchy. The total shipping entered at Istrian harbors amounts to about 6,700,000 tons annually. Istria has a separate Diet of 47 members and sends 6 representatives to the Lower House of the Austrian Reichsrat. For administrative purposes it is divided into seven districts and the Municipality of Rovigno. The population in 1900 was 345,050, the increase for the decade being about 8.4 per cent; in 1910 (census of December 31), 403,261, the increase being 16.95 per cent. The total was about 1.41 per cent of the population of Austria. In 1910 the inhabitants of Austrian nationality numbered 386,463, of whom Serbo-Croatian was the vernacular of 168,184 (43.52 per cent), Italian-Ladin 147,417 (38.15), and Slovene 55,134 (14.27). Of the total population present in 1910, 399,870, or 99 per cent, were returned as Roman Catholic. The principal towns include Pola (pop., 58,562), Rovigno (12,323), Capodistria (11,765), Isola (6101), Dignano (6087), and Parenzo, the seat of the Diet (4263). The ancient Istrians belonged to the stock of Illyrians, like them were pirates, and were conquered by the Romans under C. Claudius, 177 B.C. Part of their country was later united to Italy, part to Illyricum (q.v.). It fell into the hands of the Goths in the fifth century. In the seventh century Slavic peoples penetrated into the region. In the course of the Middle Ages parts of Istria were at different times under the rule of the Byzantine emperors, the Franks, the dukes of Carinthia, margraves of various petty German houses, the Patriarch of Aquileja, the Venetians, the counts of Görz, and the house of Austria, the bulk of the peninsula finally remaining in the hands of the Venetians and the northeastern or German portion in those of Austria. On the extinction of the Venetian Republic, in 1797, the whole of Istria became an Austrian possession.

IS'TRIANS. See Istria.

ISTURIZ, ē-stōō'rēth, Francisco Xavier de (1790–1871). A Spanish statesman, born at Cadiz. An ardent patriot during the War of Independence (1808–14), he was a leader in the revolution of 1820, and three years later presided at the Cortes and voted against the Royalists. This stand caused his exile, and he remained in England until the amnesty of 1834. In 1836 he was made Minister of Foreign Affairs and Premier. Forced to yield his portfolio during the revolution of the following August, he became president of the Cortes in 1838. He was now devoted to the cause of Queen María Christina and continued to advance her interest and the French alliance by every means in his power. Premier again in 1846, his ministry was of short duration, but he had much to do with bringing about the marriages of Isabella II and her sister María Luisa to Francisco de Asís and the Duke of Montpensier respectively, and afterward he represented his country as Minister at the Court of St. James's (1850–54) and at St. Petersburg (1856). In 1858 he became President of the Senate and ten days later was made President of the Council and Minister of State. Sent as Ambassador to Paris (1863), he held that post until October, 1864, when he resigned and retired to private life.

IS'UMBRAS. See Isenbras.

ISWARA, ēsh'wȧ-rȧ (Skt. *īśvara*, lord). An epithet applied to different Hindu divinities, but in mythological acceptation it mostly designates Siva (q.v.).

ITA, ḗ-tä'. Same as Aëta (q.v.).

IT'ACOL'UMITE (from *Itacolumi*, a mountain in Minas Geraes, Brazil). A schistose, light-colored rock composed largely of quartz grains, but also containing mica, chlorite, talc, and other minerals. It occurs in thin plates, which commonly possess the property of flexibility and can be bent backward and forward like a piece of sole leather. The cause of this flexibility is generally assigned to the peculiar form of the quartz grains; the latter, according to some observers, are elongated and have reentrant and projecting surfaces which articulate like joints. Itacolumite is associated with the crystalline schists of Brazil, where it covers large areas, and is also found along the southern Appalachians in the United States. The source of the Brazilian diamond has been referred to itacolumite.

ITAGAKI, ē'tȧ-gä'kē, Taisüke (1837–). A Japanese statesman, called the "Rousseau of Japan." He was born in the Province of Tosa in the island of Shikoku. He received the usual education of a samurai, or military gentleman, and when a young man became a strenuous advocate of the Mikado's supremacy as against the historic usurpation of the Shogun in Yeddo. In the Civil War of 1868 he was aid-de-camp to the Imperial general Arisugawa-no-Miya, and was especially active in the campaign against Aidzu in northern Hondo. After the Restoration in Tokyo he was made one of the privy councilors to the Emperor, and held that office from 1871 to 1873. He resigned because he, with Saigo Takamori of the Satsuma clan, advocated war with Korea on account of the refusal of the latter to continue the tribute which had been paid for centuries to the Shogun's government, and the further refusal of Korea "to acknowledge the Mikado as Emperor of Japan or to have any official relations with his government, which it held to be in league with the Western barbarians." The war party failed, however, and Itagaki, believing that his countrymen would have favored such a war had any political machinery existed for making known their views, became an ardent advocate of representative government based on the system of Great Britain or the United States. When, in 1877, the Satsuma Rebellion broke out under Saigo, Itagaki made fresh efforts, by peaceful agitation, for constitutional government. He organized the first political party in Japan (*Jiyu-to*, or Liberals), contending that in the constitution promised by the Emperor it should be provided that the ministry should be responsible to the Parliament and not to the throne. In 1878 he was Minister of Public Works, and Minister of the Interior in 1880. After much hesitation he accepted the title and decoration of Count in 1887. In 1898 the Liberals, under Itagaki, united with the Progressives under Okuma, and the fusion was called the Constitutional party, which had a large majority in the Lower House. The Emperor thereupon invited Counts Okuma and Itagaki to form a cabinet (Itagaki holding the portfolio for Home Affairs), which, however, lasted but six months, when the ministers resigned and the party resolved itself into its old elements. Itagaki was an uncompromising advocate of the adoption of the British or United States constitutional system as against that based on the German, drafted by Ito and adopted in 1889. He became a Christian and was long an officer of the Church.

ITALA, ĭt'ȧ-lȧ. The name given to the Latin versions of the Bible current before the famous Latin version by Jerome (q.v.). Consult Schanz, *Geschichte der römischen Literatur*, part iii, § 772 (2d ed., Munich, 1905). See Bible: (IV) *The Versions—The Latin Version.*

ITALIAN ARCHITECTURE. A term used by certain English writers to designate the Renaissance style of architecture because it originated in Italy. More properly it designates the architecture of Italy since 1800, as all that precedes that date is called by particular names of styles and periods. Modern Italian architecture displays few important works of original design, owing partly to political and industrial conditions, but more to the overwhelming influence of the past. Hence the best Italian work has been archæological in character, like the splendid façade of Florence Cathedral by De Fabbris. The most ambitious of recent works is the gigantic monument of Victor Emmanuel at Rome; stupendous in size and cost, but suffering from a lack of simplicity and restraint, a lack which is apt to characterize Italian work, as is seen also in the great Palace of Justice in the same city. See also Gothic Architecture; Renaissance Art.

ITALIAN ART. According to the general plan of the New International Encyclopædia, the art of modern European countries, which is essentially international in character, is treated under the headings of the great epochs of its development. (See ART.) The art of Italy, therefore, falls under various headings: the ancient under ETRUSCAN ART and ROMAN ART; the mediæval under EARLY CHRISTIAN, ROMANESQUE, and GOTHIC ART. The architecture of the Renaissance is likewise treated under the collective heading RENAISSANCE ART; but Italian sculpture and painting, which during this period became independent of architecture, are best treated under the general articles PAINTING and SCULPTURE, which cover the entire modern development. The local aspects of Italian painting are noticed in special articles like FLORENTINE, VENETIAN, and UMBRIAN SCHOOLS OF PAINTING (and others). The decorative arts of Italy are treated under such separate headings as DECORATIVE ART; FURNITURE; TAPESTRIES; JEWELRY; PLATE; ETC.

ITALIAN BAND. See AUGUSTUS' BAND.

ITALIAN LANGUAGE. A term used generically to denote those modern types of Latin speech spoken in the Italian peninsula, in Sicily, Sardinia, Corsica, and Malta, along the northeastern Adriatic shore (Istria, Dalmatia, Illyria), and on the southern watershed of the Alps as a whole (including the Münster, Gardena, and Gardera valleys). The Italian language on the Continent thus extends beyond the political boundaries of Italy into Austria, Switzerland, and France (Savoy). In Adriatic Austria and Italian Friuli Italian has for some decades been yielding to Slavic pressure, finding compensation in the gradual extinction of the German communes in Venetia and in strong colonies in South America (Argentina), in the United States, and in Libya (Africa).

Specifically the term denotes that type of language which is the common medium of expression in these different regions—a language of which the minuter characteristics cannot be rigidly defined, but in which the predominant element is the dialect of Tuscany (Florence, Siena, Pisa, Lucca) or, more strictly still, of Florence. In this sense the term "Italian language" is relatively modern (sixteenth century), replacing the term "Tuscan," which was, as it still sometimes is, inaccurately used to distinguish the literary language from other dialects; and the term "vulgar" (*volgare*), formerly used in opposition to school Latin.

Italian is one of the *Romance* (also called *neo-Latin*, or *Romanic*) languages (q.v.). The others are French, Provençal, Spanish, Portuguese, Rumanian. The Italian dialects of the eastern Alps are so peculiar, however, that they are sometimes classified as a separate language, *Rhæto-Romanic* or *Ladin* (from *Latinum*). A great Italian philologist, Ascoli, wished similarly to isolate the western Alpine dialects as the *Franco-Provençal* language. Still others would so treat *Sardinian*.

THE ITALIAN DIALECTS

In proportion as the Roman Empire extended, the language of the city of Rome was imposed upon her conquered territories. In Italy Latin came to supplant the Gallic languages in the north, Etruscan in the centre, Oscan, Umbrian, and allied types as well as Greek in the south. But meanwhile the language of Rome was undergoing many internal changes. Contact with the culture of the Gauls, Germans, and Greeks introduced many new words into Latin. The ancient dialects of Italy (*Italic dialects*) as they disappeared left traces behind them in the language of the capital. A certain proportion of modern Italian vocabularies is derived from these ancient sources, often anterior to the barbaric invasions. Furthermore, in Rome itself there had been from early times more or less rigid class distinctions. Economic and clannish antagonisms isolated various groups from each other. The cultivated patrician spoke a language somewhat different from the uneducated plebeian and the cosmopolitan mob. This cultivated language came to be adorned with imposing literary monuments which established standards of taste and ultimately shackled itself with a preceptualistic grammar. Conservatism thus became the rule in the literary tongue, while the populace went on adapting its linguistic expression to the most varied national and regional influences. As early as the late Empire there is a wide gap between popular, vulgar Latin and that of classic literature. It was this vulgar tongue that merchant, soldier, and colonist spread over the non-Roman Latin world in a pronunciation, a morphology, a syntax, that Cicero and Vergil would not have recognized.

This vulgar Latin, spoken by the vast hordes of the Roman populace, survived the fall of the Roman Empire and is still spoken in its Italian and other Romance forms. With the fifth century classic pagan culture, essentially aristocratic, succumbs to Christian culture, in its origins popular. The Latin of Christianity shows extensive concessions made by the classic tongue to the vulgar speech. But neither of these cultures possessed adequate machinery for educating the poorer classes, who developed their own languages without disturbance from above. The ancient cultural tradition remained, however, strongest in Italy. This fact, together with the relatively slight racial changes in Italy, perhaps explains the greater similarity of Italian to ancient Latin types.

Nevertheless, the destruction of national life broke down the intimate mutual relations of the provinces of the Empire. Regional traits in language became accentuated. Diversity increased as intensity of communication lessened. The parish differentiated itself from the town as a whole, the town from the surrounding country, one geographical or economic unit from another. Thus, the Latin tongue, which proceeded from Rome with more or less unity, broke up into thousands of types. We may classify these types for convenience into languages, dialects, and patois; but such delimitations have no absolute value. Were we to take account of all the slightest variations of speech, there would be almost as many types as there are speaking individuals. In the city of Venice there are two distinct linguistic "spheres"; the language also of a Venetian proper differs from that of a citizen of the Venetian mainland, who would in turn find even difficulty in talking with a Lombard or a Furlano and be driven to despair or to delight in Genoa and Palermo. Time has much the same effect as distance. In Italy, however, there is not so great a gap between the old dialects and their modern forms as is found in France.

For the characteristics of vulgar Latin as opposed to the classic tongue, see the article on ROMANCE LANGUAGES. Here we shall outline summarily the general linguistic types that show more or less widely distributed developments from this vulgar Latin.

I. Dialects showing more or less dependence on Romance types outside of Italy.

1. Franco-Provençal dialects (Savoy, Wallensia, the upper valleys of the two branches of the Dora, of the Orco and the Stura). Distinctive characteristics: (*a*) Latin palatal + *a* = *e* or *i* (capream = *zevra*). (*b*) Preservation of Latin pluperfect indicative and imperfect subjunctive (portaveram = *portaro;* haberem = *avre*). (*c*) Preservation of *t* in third person singular of verbs (portat = *portet*). (*d*) Lat. *ca* = *che* or *che*, as in French (carum = *sir*).

2. Ladin dialects (Swiss Grisons, Münster, valleys of Gardena and Gardera, Noce, Avisio, Corievole, Boite, upper Piave, the Province of Friuli, the upper Ticino, upper Mera, Val Fiorentina, and Cadore). Characteristics: (*a*) Lat. *ca* and *ga* are palatalized (capillum = *chavel*). (*b*) Lat. groups *pl*, *cl*, *gl*, etc., remain intact (claves = *clefs*). (*c*) Plurals are formed with *s* (rami = *rames*). (*d*) Lat. accented *a* = *e* (canem = *zen*). (*e*) Lat. accented *ū* = *ü*, as in French (mulos = *müles*). (*f*) Diphthongization of the other accented Latin vowels *in position* (before two consonants): *e* = *ie; e* and *i* = *ei; ō* and *ŏ* = *ue* = *ue, ö* (like French *eu* and *œu*) (nivem = *neif;* oculi = *oeje;* modum = *mŏd;* infernum = *infiern*).

II. Dialects independent both of French and strictly Italian systems. These embrace the group formerly called *Gallo-Italian* (Ligurian, central in Genoa; Piedmontese, central in Turin; Lombard, in Milan; Emilian, in Bologna). Here belongs also Sardinian, with three types corresponding to the regions of Logudoro, Campidano, and Gallura.

1. Gallo-Italian group. Characteristics: (*a*) Final unaccented Lat. vowels drop in Pied., Lom., and Emil. (retem = *red;* vocem = *votsh*). (*b*) Pretonic Lat. vowels drop in Pied. and Emil. (dinerum = *dnê*), sometimes developing a prosthetic vowel (rumorem = *armor*). (*c*) Lat. accented *ū* = *ü* and *ō* = *ö* in Pied., Lig., and Lom. (durum = *dür;* novum = *növ*). (*d*) Lat. accented *ē* and *ĭ* = *ei* in Pied., Lig., Emil. (habere = *aveir*); the diphthong *ie* from Lat. *ĕ* does not, however, appear. (*e*) Lat. accented *a* = *e* generally, except in Lig. (andare = *ander*). (*f*) Nasalization of *n* generally (panem = *pân*). (*g*) Vocalization of palatal in Lat. group *ct* (factum = *fait* and *fatch*), which is also confused with *pt* (scriptum = *screihtor*). (*h*) Disappearance of intervocalic *d* generally and in Lig. of *l* and *r* (ridere = *rie;* dolorem = (in Genova) *durur* = *dü* through step *duu*). (*i*) Lat. *g* between back vowels (*a* or *o*) = *j* (in Piedmontese) (braga = *braja*). (*j*) In Lig. *pl* (Lat.) = *ch* (as in Eng. *church*), *bl* = Eng. *j* (as in *joy*), *fl* = *sh* (plus = *chü;* rabies = *rajja;* florem = *shü*). (*k*) In Lig. a final Lat. *s* often becomes aspirate *h*, as is regular in Sanskrit and as occurs also in the dialect of Bergamo (grossum = *groh*). (*l*) A Latin final *i* causes umlaut generally (bonum = *bön*, but boni = *boin*). (*m*) In Emil. verbs show large use of present subjunctives in *-pa* (siam = *sipa*) and of preterits in *-p* (fuit = *fop*). (*n*) Subject pronouns are triplicated or duplicated generally (cantas = *ti te cantet*, that is really Lat. *te te cantas tu*).

In these dialects the presence of nasal vowels and of the French *ü*, the summary justice done to unaccented vowels and the reduplication of pronouns have been ascribed to ancient Celtic influences. Their unintelligibility is a standing joke among educated Italians, who see their sonorous *fiore* and *dolore* reduced to squeaky monosyllables, *shü* and *dü*.

2. Sardinian group. Characteristics: (*a*) The Latin accented vowels are all preserved, i.e., *ĭ* and *ŭ* do not blend with *ē* and *ō* (nucem = *nughe;* pilum = *pilu*). (*b*) Similarly the unaccented final vowels (see ib.). Sardinian thus furnishes corroboration of the derivation of Romance nouns from Latin accusatives, since the treatment of accusative *-um* and ablative *-o* is different, whereas in Italian generally they would be the same. (*c*) Final *t* and final *s* survive (plantas = *plantas*, amat = *amat*). (*d*) Lat. *c* and *g* remain hard before *e* and *i* (facis = *faghes*). This phenomenon, of questionable antiquity however, has been held as proof of the Latin pronunciation of *c* and *g* in this situation. (*e*) Initial *cl*, *bl*, etc., survive (clarum = *claru*). (*f*) Lat. *ny* = *nzh* (melius = *mezhus*). (*g*) Lat. *qua*, *gua*, *cu*, and *gu* = *bba* or *bb* (aquam = *abba*). (*h*) Lat. *ll* = *dd* (bellum = *beddu*). (*i*) Lat. *s* + consonant prefixes, when initial, a permanent *i-*, which is movable in Italian generally (stellam = *istella*). (*j*) Phonetic changes are widely determined by position of words in the sentence (*Satzphonetik*): *su ove* = *the ox*, but *sos boves* = *the oxen*, the *b*, i.e., dropping between vowels. (*k*) The definite article derives from *ipsum* (= Sard. *su*, plural *sus*), not from *illum* (= It. *il*, *lo*, Fr. *le*, etc.). (*l*) Lat. imperfect subjunctive survives in verbs (cantarem = *cantere*). (*m*) Preference of preterits in *-si* (cantavi = *cantesi*). (*n*) Future formed by Lat. *habere* + preposition *ad* + infinitive (habeo ad manducare = *hapo a mandigare*, I shall eat). This is conclusive corroboration of the etymology of the Romance future.

Sardinian in general seems to represent an earlier stage of vulgar Latin than other Romance languages. It is one of the most important and interesting for linguistic study.

III. Dialects with pronounced affinity to the Tuscan system.

1. Venetian (Venice, the Venetian estuary, and mainland as far as the Adige, the Alps, and Friuli). Characteristics: (*a*) Loss of intervocalic *d* (crudum = *cruo*). (*b*) Intervocalic *k* = *g* (amicum = *amigo*). (*c*) Lat. *cl* = *ch* (as in Eng. *church*) (ecclesia = *cesa* for It. *chiesa*). (*d*) Lat. *sc* before *e* and *i* = *ss* (piscem = *pesse*). (*e*) Intervocalic *ly* = *j* (like *z* of Eng. *azure*) (familia = *famegia*). (*f*) Third singular replaces third plural in verbs (cantant = *i canta*). (*g*) Preference for participles in *-esto* in second and third conjugations (vedutum = *vedesto*). (*h*) The *s* of Lat. second person singular is preserved in interrogation (habes = *ti a*, but habes tu? = *astu*). (*i*) Intervocalic *l* tends to disappear in contemporary dialect (insalatam = *insaaa*). (*j*) Lat. *est* = *xe*. (*k*) Double consonants become single (bellum = *belo*). The great similarity of this dialect to the literary tongue has given its literature a ready diffusion outside of Venetia.

2. Corsican. There is a Sardinian trend and a Tuscan trend: (*a*) Lat. gu = *bu* (gunna = *bunna*, It. *gonna*). (*b*) Lat. first conjugation is sometimes attracted to third (laxare = *leche*). (*c*) Unaccented vowels survive, with *u* for *o* and *i* for *e* (lactem = *latti*, pilum = *pilu*). (*d*) Lat. accented *ar* + cons. = *e* (carnem = *chern*). (*e*) Lat. *ll* = *dr* (bellum = *bedru*, It. *bello*). (*f*) The suffix *-one* is diminutive, as in French (fratellonem = *fratedronu*, little brother).

3. South Italian dialects—Sicilian, Neapolitan, Roman (Umbria, Marche, Roman Province). General characteristics: (*a*) Intervocalic *t* survives (setam = *seta*). (*b*) Intervocalic *d* = *r* (ad duos = *a roi*). (*c*) Lat. *nd* = *nn* (discendere = *scennere*), so also *mb* = *mm* and *nv* = *mm*. (*d*) Lat. *pl* = *ky*, *bl* = *j* (Eng. *joy*), *fl* = *sh* (plus = *chiu*, rabiem = *raggia*, florem = *sciuri*, It. *fiore*). So also for *py*, *by*, *fy* (sepia = *secchia*). (*e*) Lat. *ce*, *ci* = *tts* (glaciem = *iazzu*). (*f*) Dropping of initial vowels (intendere = *'ndennere*). (*g*) Double consonants are preserved, and many single consonants are doubled (de post = *doppu*). (*h*) *Satzphonetik* (see above) is prevalent (dominam = *donna*, but unam dominam = *'na ronna*). Special characteristics:

A. Sicilian. (*a*) Lat. *ĭ* and *ŭ* survive, but Lat. *é* = *i* and *ó* = *u* (pilum = *pilu*, *credere* = *criditi*, solem = *suli*). (*b*) Intervocalic *ly* = *ghy* (filiam = *figghia*). (*c*) Intervocalic *ll* = *dd* (bellum = *beddu*).

B. Neapolitan (principal variations: Calabrian, Abruzzese, Otrantine, Leccese, Basilisk for the Basilicata, Neapolitan for region of Naples). (*a*) All Sicilian characteristics more or less prevalent (filium = *figghiu*, vocem = *vuci*, caballum = *cavaddu*). (*b*) Lat. *fl* = *hy* (florem = *hyuri*). (*c*) Lat. *ŏ* = *ue* (corem = *cueri*) and unaccented often = *au* (honorem = *anaure*). (*d*) Accented Lat. *a* = *e* (capum = *ghepe*). (*e*) In Abruzzese a general dropping or weakening of unaccented vowels (satisfactionem = *sfaziaune*), which is limited more usually to finals (bonum = *buone*). (*f*) Neapolitan follows the Romance tendency for Lat. *i* = *e* (venis = *viene*), following Sicilian, however, for accented Lat. *o*, *u* and *e*, *i*. (*g*) Accented Lat. *ĕ* and *ŏ* diphthongize in position, i.e., before two consonants (apertum = *apierte*, mortem = *muorte*). (*h*) Creation of consonants between vowels in hiatus (alterum = *avotre* through steps *autro*, *aultro*). (*i*) General diffusion of Lat. pluperfect indicative (feceram = *faceru*). (*j*) Traces of ending *t* in third singular of verbs (habuit = *ebbeti*). (*k*) In Abruzzese third singular replaces third plural. (*l*) Lat. neuter plurals in *-ora* survive (tempora = *tempora*).

C. Roman and Umbrian. (*a*) Lat. *ld* = *ll*, *nd* = *nn*, *mb* = *mm* (plangendum = *piannenne*, calidum = *callu*, plumbum = *piommo*). (*b*) Diphthongization of *ĕ* and *ŏ* in position (tempus = *tiempi*, dominam = *duonna*). (*c*) Survival of Lat. *intus* and *apud* influencing prepositions *ad* and *in* (ad = *ta*, in = *me* before article). Here also a wide diffusion of Tuscan elements on the one hand and Neapolitan on the other.

IV. The Tuscan dialects (Florentine, Pisan, Lucchese, Sienese, and Aretine). Characteristics: (*a*) Lat. *c* between back vowels = *h* (illam casam = *la hasa*). (*b*) Lat. *ly* = *gghi* (filiam = *figghia*) or disappears (alium = *aio*). (*c*) Lat. *l* + *consonant* = *i* and *u* (alterum = *ailtro* and *autro*). (*d*) Intervocalic *t* = *h* (adripatum = *arrivaha*). (*e*) In Lucca *tj* = *ss* (plateam = *piassa*). (*f*) Also Lat. *s* = *th* (preso = *pretho*). (*g*) Lat. -unct = *-ont* (unctum = *onto*). (*h*) Unaccented *e* = *e* (te = *te*, It. *tu*). (*i*) Frequent interchange of *l* and *r* (mortem = *molte*). (*j*) Assimilation of pretonic vowel to the tonic, and of post-tonics to the final (utilem = *utele*, ridiculam = *ridiquala*). (*k*) Palatalization of *t*, *d*, *l*, *n*, before a final *i* (quarti = *quarkye*, cani = *kegne*). (*l*) Metathesis of *i* between vowel and consonant (medietatem = *meità* = *metià*, vocitum = *voito* = *votio*).

THE LITERARY TONGUE AND THE "QUESTION OF LANGUAGE"

While Latin held almost undisputed sway in the written document and in interregional communication, these dialects reigned undisturbed in their respective territories. The earliest popular Italian documents (tenth century) are dialect in language. And when, in imitation of the popular literature of France and Provence, the Italians set about conscious artistic production, each Italian thought of writing only in his native dialect. Thus, in the thirteenth century the poetry of the court of Frederick II is notably Sicilian and at any rate Southern in language; the epic poetry of the north is markedly Venetian, while Umbrian forms the base of the splendid Franciscan dialogues in verse. Had Venetian imperialism, e.g., succeeded in unifying Italy politically, doubtless Venetian would to-day be the Italian language just as the language of the Capetian estates of the Ile de France became the French tongue. But Italy was destined to attain cultural unity long before political independence, though the linguistic hegemony of Tuscany has never been as undisputed as the present political leadership of the house of Savoy.

Its earliest rival was the hybrid Southern language of the Sicilian court, which was raised to some dignity by a fairly extensive literature in the thirteenth century. But this language, in this literature, rested on the artificial foundations of the culture that characterized the court of Frederick II; and its development ceased with the dispersion of that court. A variety of causes gave, already at this early date, the predominance to the Tuscan dialect. Tuscany occupies a central position in Italy. Its dialect of all the Italian group departs least in phonology and morphology from classic Latin, and therefore best of all the dialects it harmonized with the traditions of Latin culture. The aggressiveness of Florentine commerce is only secondary in its influence to the great fact in the history of the Italian language that Florence developed a local culture worthy of taking up the heritage of the Sicilian poets and capable of producing the three literary artists who summarize Italian thought and feeling of the early Renaissance and late Middle Ages—Dante Alighieri, Francesco Petrarca, and Giovanni Boccaccio.

The *Divine Comedy* of Dante was the only book of its age able to hold in popular culture the position of Vergil in the Latin tradition. It alone was sufficient to turn the whole current of cultivated expression into one channel. But Tuscany was fortunate again in producing Petrarch, whose cosmopolitan training and distinctly modern outlook were likewise able to cast in a Tuscan mold all the intellectual aspirations of a new age that might have found Dante outworn. While thus the two supreme models of Italian poetry were Tuscan, Boccaccio came to complete the series with the brilliancy of his prose. Italians who saw in Dante and Petrarch poets equal to Vergil and Horace and in Boccaccio a rival of Cicero readily came to see in the language of these men a peer of Latin. As early as 1435 the doctors of Pope Eugene's court were debating on the "regularity" of the vulgar tongue (Tuscan), and the *certame coro-*

nario (poetic contest) of Florence (1441), though its productions cast little glory on the Italian language, at least signifies the existence in learned circles of the conviction that the language of the "Three Crowns" (Dante, Petrarch, and Boccaccio) was as "noble" as Latin. It was to demonstrate this equality, particularly to show that the categories of Latin grammar were applicable with the same preceptual force to Italian, that the earliest grammars were written (Lorenzo il Magnifico (?), c.1490; F. Fortunio, 1516).

But the examination of the linguistic question in Italy soon revealed a very troublesome situation. Italians outside of Tuscany, as they attempted to write in the language of Petrarch and Boccaccio, could not free themselves from the consciousness of their own native dialects. Dialectical tendencies in the literary tongue were especially strong in the regions closely kindred to Tuscany (Venetia, Rome, South). Moreover, in Tuscany itself Latin culture had eliminated from the literary language the most prominent and "barbarous" dialecticisms (*s* = *h*, *ly* = *gghi*, *st* = *sht'*, *l* = *r*, *unot* = *ont*, etc.; see above). What theoretically was to be the status of these different elements? The Italian grammarians of the Renaissance had, as their most effective instrument in answering this question, the rhetorical theory of imitation, and they grouped themselves into schools according to the manner in which they applied it. The most fortunate of these early groups was that of classic purism, headed by Cardinal Pietro Bembo, whose book of *Prose* (1525) rigidly defined Italian as the language of the Three Crowns, which Bembo brilliantly illustrated in his own writings. This theory, in effect, made Italian really a "dead" language, since in vocabulary and syntax it was not to exceed the limits of Dante, Petrarch, and Boccaccio, in which triad Petrarch and Boccaccio for their cosmopolitanism in language were recognized as primates. This weakness was soon discerned and violently combated by the Tuscan school (Machiavelli, Claudio Tolomei, G. B. Gelli, and P. F. Giambullari), who recognized the Tuscaninity of the Three Crowns and concluded that a living language, in harmony with the cultural tradition, should follow the living Tuscan speech as spoken by cultivated Tuscans. This group also had a Sienese wing (C. Cittadini, O. Lombardelli, S. Bargagli), originators of the apothegm "lingua florentina in bocca senese," which succeeded definitively in coupling Siena with Florence as the fountain of "pure" Italian. But the pretensions of these Tuscan schools ran contrary to the regional sentiments of most other Italians, and their resentment at the very term "Tuscan" first gave currency to the term "Italian language," previously called either "vulgar" or "Tuscan." Nevertheless, all grammarians, whatever the color of their doctrine, accepted the theory of imitation, and it was the theory of Bembo, modified by admitting to parity with the Three Crowns all "good writers" (e.g., Sannazaro, Bembo himself, Ariosto, Tasso, Della Casa), that ultimately triumphed. This wider classicism, first codified by Salviati on a Florentine basis, has been the guiding principle of the Accademia della Crusca, which since its foundation in 1583 has in its successive dictionaries pretended with some success to the rôle of arbiter in Italian linguistic matters. In the seventeenth and eighteenth centuries the Crusca had several antagonists: its theory of the authority of classical usage was attacked in the individualistic system of G. B. Vico, in the doctrine of "logic" and analogy which gained currency under the influence of French philosophy, more subtly again in the theories of "gallantry" and "taste" that filled the pre-Revolutionary academies. The Crusca itself has been profoundly modified in the last 50 years by the Manzonian theory of Italian. Alessandro Manzoni, in his criticism and in the polishing of his famous romance *I promessi sposi* (The Betrothed), compromises between the doctrine of classic purism and Tuscan usage, correcting the "barbarisms" of Tuscany by means of the classic tradition, but reconciling the inconsistencies of the classic authors and providing for growth by adopting such usage as is justified by the living language as spoken in Florence. This is the doctrine that at present is forming the literary Italian language and that is exemplified in the grammar of Luigi Morandi-G. Cappelletti that the Italian government has imposed upon elementary schools.

In this literary tongue the intensely Latin quality of the Florentine dialect is preserved. Italian *accented* vowels follow in general the simpler changes of vulgar Latin (*a* = *a*, *ū* = *u*, *ŭ* = *o*, *ī* = *i*, *ĭ* = *e*, *ō* = *o*, *ē* = *e*). Of the diphthongs from *ĕ* and *ŏ* (*ie*, *uo*) in free position (followed by one consonant), the second (*uo*) is tending to revert to *o* (pedem = *piede*, novum = *nuovo* and now frequently *novo*). The simple vowel changes occur also in unaccented vowels, where, however, pretonic *e* is often *i*, and where the influence of labials is often felt (demandare = *dimandare*, but regularly *domandare*). The most radical of the consonantal changes affects the groups *bl*, *cl*, *pl*, which become *bi*, *ki* (spelled *chi*), *pi* (clamare = *chiamare*, planum = *piano*, blondum = *biondo*); but assimilation of other groups is general: *ct* = *tt*, *pt* = *tt*, *gd* = *dd*, etc. (factum = *fatto*). This phenomenon is most disfiguring of Latin when the assimilation takes place after the loss of an intervening unaccented vowel (venire habeo, I shall come = *venirò* = *venrò* = *verrò*). As in other Romance tongues, the Lat. groups *ce*, *ci*, and *ge*, *gi* have palatalized (*c* = *ch* in Eng. *church*, *g* = *g* of Eng. *gem*). Purely Latin, on the other hand, is the preservation of double consonants (gallum = *gallo*, i.e., *gal-lo*). In morphology, Italian has reduced the Latin noun cases to two, accusative singular and plural, and the total number of verb tenses and moods to eight simple and seven compound tenses, supplying the deficiency by means of prepositions (homini = *all' uomo*, to the man) and auxiliary verbs (fecerat = *aveva fatto*, he had done). While the vocabulary of Latin has been made to meet all the conditions of Italian life in its changing history, the simplicity of the phonetic and morphological changes, coupled with a fairly perfect phonetic orthography, has made the acquisition of Italian easy for a person who knows Latin or any of its modern Romance forms.

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ITALIAN LITERATURE. The literature written in the Italian language (q.v.). [In view of the necessarily restricted space allotted to minor authors in our biographical articles, we shall treat Italian literature, especially the earlier period, with somewhat greater detail and length than the corresponding portions of English and French literature.] Two salient facts characterize the early history of Italian literature: its relatively late beginning (as compared with French, Spanish, and the Germanic literatures) and its extraordinarily rapid rise in less than a century to the heights of Dante, Petrarch, and Boccaccio. Both these facts are due to the tenacity of the Latin tradition in Italy. From Boëthius and Cassiodorus (sixth century) down through the Middle Ages, Italians read the Latin classics and wrote Latin even with elegance—all the more because the barbaric invasions did not cause ethnological and social disturbances so violent and thoroughgoing as those beyond the Alps. There was in Italy no central political power. Life developed regionally and municipally rather than nationally; there was no national spirit to develop an Italian epic literature, no feudalism to foster a Provençal chivalry. The cultivated classes turned rather to the history of their ancient glories, to science and philosophy, and their productions in these fields were for the learned public rather than for the populace. Here Latin was the traditional and the efficient tongue. This culture, moreover, had roots in the laity as well as in the clergy. By the middle of the thirteenth century science and philosophy had attained a high degree of excellence, with all the vigor of civic and intellectual life attendant upon them. Early Italian literature reflects this culture rather than the untaught emotions of a naïve and ignorant populace. So in a sense Italian literature was born full grown.

Thus until the first half of the thirteenth century Latin continued to serve in Italy for the writing of chronicles, historical and narrative poems, heroic legends (many of them introduced from France; e.g., the story of Charlemagne and his knights, of Arthur and his Round Table, the mediæval account of the fall of Troy, and the history of Alexander the Great), religious legends and lives of the saints (cf. the famous collection of the Bishop of Genoa, Jacopo da Voragine (1230–98), known as the *Legenda Aurea*), didactic and scientific works (grammars, encyclopædias, and treatises on morals and philosophy), religious lyrics (hymns like the "Stabat Mater" and the "Dies Iræ"), and liturgical plays and mysteries (the prototypes of the first Italian dramas, the *rappresentazioni sacre*). But Latin was not the only language written in Italy before the time when Italian was thought dignified enough for literary use. The poets of southern France had already wandered into Italy before the end of the twelfth century, and when the Albigensian Crusade drove them forth in the early years of the fourteenth century, the troubadours crossed the Alps in still greater numbers and sang throughout the land of the Apennines their Provençal songs of love and political strife. There soon arose a school of Italian poets who imitated the methods of these Provençal troubadours and, disdaining their native tongue, wrote in the foreign Provençal. Prominent among them were Alberto Malaspina (c.1165–1210), Lanfranco Cigala (c.1200–c.1260), Bonafacio Calvo (c.1200–70), Bartolomeo Zorzi (c.1250), and especially Sordello (c.1200–c.1270), made immortal by Dante. Like the speech and song of southern France, the speech and verse of northern France also entered Italy at an early date. The jongleurs brought the *chansons de geste* into the north of Italy, and there, especially in the domain of Venice, great currency was given to the stories of Charlemagne, of his mother Berte, of his knights, like Ogier le Danois, and the heroes of the Carolingian cycle. The *chansons de geste* were introduced in their native speech. Soon, however, Italians took them up and told the stories in an Italianized form of French (cf. Niccolò da Verona's *Prise de Pampelune*), and later still certain of the *chansons* were related by Italians in a mixed speech, in which Italian predominated. The epic matter thus worked over in Italy was to become of great importance for the history of the poems of chivalry in the fifteenth century. From northern France there were imported also the *fabliaux*, the stories of Reynard the Fox, and the great allegorical and satirical *Roman de la rose*, all of which played a part in the formation of the literature of Italy.

The great popularity of such literature in the thirteenth century, especially of Provençal poetry, seems first to have impressed upon Italians the possibility of doing similar things in Italian. We have, indeed, specimens of written Italian that date back almost to the middle of the tenth century, but they have no literary significance. Nor does the eleventh century show anything of importance, and the more substantial documents ascribed to the twelfth century, such as the *Cantilena bellunese*, the *Ritmo cassinese*, and the *Cantilena di un giullare toscano*, have even less artistic worth than the isolated attempt at writing Italian verse on the part of a foreigner, the Provençal poet Raimbaut de Vaqueiras, in his jocose bilingual *contrasto*. With the thirteenth century, however, Italian assumes literary significance. In all parts of Italy the popular language is now used for the composition of verse, which for half a century remains much more important than prose in the vernacular.

It was at the court of Frederick II (1194–1250) in Sicily that the Provençal lyric manner was first imitated in Italian. Hence the early

Italian poets are generally grouped together as the Sicilian school, although in point of fact they were not all Sicilians, but had Apulians and Tuscans among them. Chief among their number were the Emperor Frederick himself, his son Enzo (c.1225–72), his Chancellor, Pier della Vigna (died 1249), and Giacomo da Lentino, who, one of the most fertile of all, was regarded by Dante as one of the best of the school. These and the other members of the movement simply wrote Provençal poetry, but in their native tongue, so true is it that, aside from the language, there is nothing Italian in their verses, as indeed there was nothing Italian in the society this school reflects. It was unfortunate, too, that the poetry of Provence had by this time itself passed from the spontaneous character of fresh psychological analysis into a decadent conventionalism. Here and there one may find among these Italians a trace of the warm gentleness that was the discovery of Provençal chivalry, but more often they sing with a gallant banality. They adopted the *canzone* (q.v.) as their stock poetic form, and from them the manner spread into central Italy and Tuscany, finding acceptance especially in the towns having close relations with Frederick's court. Thus Arrigo Testa in Arrezzo, Folcacchiero de' Folcacchieri in Siena, and many more reëchoed the Sicilian note. In at least one writer of this class, Buonagiunta Orbicciani, there is manifest a tendency to depart somewhat from the methods of the Sicilian school and to introduce elements of Tuscan origin. This tendency becomes a certainty about 1260–80, in the lyrics of two sets of poets, the one belonging to Tuscany, the other to Bologna, and both representing a transition period during which prominence is given to the sonnet as well as to the *canzone*.

In this second phase the Provenzalizers (*Provenzaleggianti*), as they are called, read into the hackneyed praises of their ladies philosophical and religious meanings. Human love is studied as to its origin and nature and its resemblances in cause and effect to divine love. So the lady who inspires human love comes to symbolize the divine power that inspires love of God, and thus to assume a part in the process of salvation itself. So at this early date Italian poetry tends towards erudition and intellectuality, characteristics that are permanent. Aristocratic and impersonal, it is nevertheless henceforth associated with the national culture.

Of the Tuscan poets the most important was Guittone del Viva of Arezzo (1220–94), one of the noncelibate friars called *Frati godenti*. In his earlier poems he adhered closely to the strict Provençal manner. In the later ones, replete with Latinisms in vocabulary and construction, he introduces speculation of a moral, religious, and philosophical nature, and, with a new and healthy outlook, he addresses to his fellow citizens remarks on matters of contemporary political interest. This attention to political matters of the day is stressed also in other members of the Florentine group, of whom Monte Andrea and Frescobaldi may receive a passing mention. The greatest departure from the mannerisms of the Sicilian school was made by the Bolognese group of writers, and the best of all these was Guido Guinicelli (c.1230–76). From his *canzone* beginning *Al cor gentil ripara sempre amore* may be said to date the manner called the *dolce stil nuovo*, or sweet new style, which reached its height of excellence in the sublime poetry of Dante. Love and nobility (*gentilezza*), says Guinicelli, are as inseparable as light and fire. So the loved one, bearing the semblance of an angel, awakens nobility in the heart (inherently noble) through love. It remained still for Dante's idealism to proclaim that love could create nobility even in the ignoble heart. The methods of Guittone and Guinicelli were adopted by the Florentine Chiaro Davanzati (c.1230–?), whose conception of love is, however, rather a matter of Christian symbolism than of philosophy. Among the Tuscans the most Tuscan of all for direct contact with life are Rustico di Filippo (c.1220–c.1280) and Cecco Angioleri (1255–?), who have some affiliations with Provençal idealism, but who also wrote satirical sonnets of a high order of humor.

Meanwhile the influence of Northern French literature was also making itself felt in Italy. But yielding the lyric to Provence, it is rather in didactic literature that this other foreign model prevailed. From Milan, Gherardo Patecchio (Girardo Pateg, c.1228) explained the "Proverbs of Solomon." If he takes anything from Provence, it is still the biting, moralizing satire of his *Noie* (Ennuis). The catechism is turned into verse by Uguccione da Lodi (Uguccon de Laodho). More pretentious in scope was the didactic poetry of Bonvesin da Riva and Giacomino da Verona, of whom the latter contributed to vision literature the *Libro delle tre scritture* (black for hell, red for redemption, and gold for salvation). Of the same class is an anonymous poem, styled vaguely as *Atrovare* from Reggio d' Emilia. A similar dreary didacticism appears again in the *Sermoni* of Pietro de Barsegapé. Thus early the practical unimaginative character of the north stands out against the more idealistic tendencies in the south. And the two trends, likewise permanent characteristics of Italian literature, meet in Florence for their perfection. For the best writer in this didactic genre is Brunetto Latini (c.1220–c.1294), whom a too literal interpretation of a statement made by Dante (*Inferno*, xv) has caused to be considered as the latter's tutor. He was certainly a great factor in promoting culture in his own time. To Brunetto Latini, in addition to prose works and certain minor poems, there must be ascribed the allegorical poem called the *Tesoretto*. He intended this to be a sort of preface to his encyclopædic work, *Li livres dou tresor*, which he wrote in French. The initial motive to Brunetto's poem was probably furnished by the *Consolations* of Boëthius, but here, as in all this literature, the great formative influence was the *Roman de la rose*.

To northern Italy, a favorite haunt of the wandering jongleurs, belongs also at this time much narrative verse in Italian showing the Northern French material of the *chansons de geste* (cf. the *Buovo d' Antona*, almost wholly Italian in treatment) and the beast epic (cf. *Rainardo e Lesengrino*, in two Venetian versions), thoroughly acclimated in Tuscany, as we shall see, after having passed through Franco-Italian intermediary forms. This epic material, though borrowed from abroad, was essentially popular in appeal. But it had to combine with another native Italian tradition, substituting the octave stanza for the ponderous French *laisse*, before it lost its savor of exoticity. Proofs are not lacking of the early existence and independent origin of a thoroughly popular Italian poetry, occasional in its nature and dealing with love or matters chiefly of local significance. For samples of this poetry we must go to the works of more consciously artistic poets who imitated it, or else judge of it from similar productions of later date. Thus Giacomino Pugliese adopted some of its forms, and a charming bit of it has come down to us attributed to Cielo d'Alcamo, one of the Sicilian group. This is a *contrasto*, or dialogue, between lover and lady: his passion is impudently spurned by a coquetry that is only too ready to yield. These characters, clearly objectified, spar back and forth with delicious humor.

But for really great, and at the same time thoroughly native, poetry we must turn to the Umbrian school of popular Franciscan poets. Drunk with the religious fervor of St. Francis of Assisi, these monks carried the good message to the multitude in its own language and its own poetic forms. They brought the Holy Office from the church to the market place, not with the cumbersome machinery of the French mystery, but in the simple narrative of the Gospels condensed into its most tragic and human essences. The *laudi* (Praises) of the Umbrians have an historical importance for the Italian theatre, especially in relation to Lorenzo il Magnifico and Poliziano. But the *Crucifixion* and the *My Lady Poverty* of Jacopone da Todi are masterpieces in their own right.

Italian prose of literary moment did not appear until the second half of the thirteenth century. As has been said, many narrative and didactic works were written in Latin. Moreover, like Brunetto Latini, certain other Italians adopted French for their productions; thus, Aldobrando, a Tuscan, composed in French prose his little treatise *Le régime du corps* (1256), and Rusticiano da Pisa employed the same language in his compilation of tales about Arthur and his knights (c.1270) and in his account of the journey of Marco Polo. Italian prose was first used to any great extent in translations of Latin didactic, moral, and historical works, and of French legends of an heroic or a religious nature. Original prose works began to appear later. Among them were the letters of Guittone d'Arezzo (1220–94), which display an unmistakable attempt to create a sort of poetical prose in Italian; the didactic works of Guidotto da Bologna (c.1266), of Tommaso Gozzadini (second half of the thirteenth century), of Ristoro d'Arezzo (1282), and especially the *Introduzione alla virtù* of Bono Giamboni (second half of the thirteenth century); certain chronicles and historical accounts; and, most interesting of all, certain collections of tales. Already in the thirteenth century professional tellers of tales (*favolatori*, *novellatori*) wandered about northern and central Italy relating stories derived from all possible sources. Written collections of their tales or of similar ones were the *Conti di antichi cavallieri* (second half of the thirteenth century), consisting at least in part of rather free versions of matter originally French and Latin, and the *Novellino*, worked over in many versions even before the end of the thirteenth century and displaying no little skill in the art of story-telling, which Boccaccio was to develop to the fullest before another century had passed.

This summary review of the pre-Dantesque Italian literature makes clear the fact that by this literature alone we are entirely unable to explain the genius of Dante. Had he left only his minor works he might be intelligible on the basis of the literary tradition: the poetry of Guinicelli, Davanzati, and Fra Guittone leads up to the *Vita nuova* (c.1290) and the *Canzoniere*. Had Dante stopped here he would have been noteworthy among the fairly ordinary poets of the sweet new style: Guido Cavalcanti, Dante's first friend, who philosophizes on the nature of love with a graceful idealism, Lapo Gianni, Dino Frescobaldi, Gianni Alfani, and Guido Orlandi, who likewise sing of ladies angelified and form a manner that hastens to a conventional degeneration in their immediate and younger followers. The *Convito*, too, would be notable, simply for its unusual competence, alongside of the commentaries of Francesco Barberino (1264–1348) and the treatises of Domenico Cavalca (1270–1342). The *De Monarchia*, in Latin, might in part seem probable after the chronicles of Dino Compagni (q.v.) and in connection with those of Giovanni Villani (1275–1348), both of whom reflect the political temper of Dante's age. But what shall we say of the *De Vulgari Eloquentia*, of which the philological acumen has no parallel till we reach the eighteenth century in Italy, and then in the isolated case of Giambattista Vico? Or of the *Commedia*, which stands on a solitary pinnacle not only in Italy, but in the civilization of the world? The *Comedy* of Dante is an allegorical poem, and we might cite in a similar category the *Intelligenza* or the *Fiore*, anonymous poems in the sequence of the *Roman de la rose*, which might lead rather to poems of the calibre of the Dantesque imitations of Cecco d'Ascoli (Francesco Stabili, 1257–1327), who wrote the *Acerba;* of Dante's son Jacopo, who wrote the lumbering *Dottrinale;* or Francesco degli Uberti, author of the *Dittamondo*. To understand the possibility and the full meaning of Dante's *Comedy* we must go outside the field of Italian belles-lettres and penetrate into the essence of all mediæval culture. We must follow him into the scientific movement shown in part in the works of Albertus Magnus, into philosophy that had been treated with synthetic vision by Thomas Aquinas, into the mysticism of St. Bonaventura and the democratic exaltation of St. Francis of Assisi. Nor could we stop here. There would still remain the plastic sensibility and imaginative sweep of concept of a Giotto or a Niccola Pisano, the serene splendor of the Ducal Palace in Venice, the simple elegance of Santa Croce. There would still remain the civic life of Florence that was pushing upward out of feudal anarchy into proletarian democracy on the basis of an industrial wealth, developing for itself vast lines of foreign trade. If, then, we take the essential elements of each of these aspects of mediæval life, isolate its basic problems of science and philosophy, catch its political and social emotions at fever heat, visualize its exterior traits with luminous clarity, and then conceive of them all as coordinated into a unit by the dominance of an unclouded intellect, and expressed with a training chastened and beautified by a sense of classic form, we shall have arrived at some appreciation of the *Comedy* of Dante.

The *Comedy* of Dante is the complete and crowning expression of mediæval culture. The

Canzoniere of Francesco Petrarca looks, on the other hand, towards the future and expresses the feeling, even if it does not with equal completeness exhaust the mind, of Italians for four centuries to come. Between the two men there were certain affiliations. Petrarch may have met Dante at Pisa in 1311, when Petrarch was seven years old. He knew, admired, and felt a certain emulation of the *Comedy*. Petrarch's poetry has more than one reflection of the manner of the sweet new style, and he was in personal contact with the later poets of that school, some of whom were equally intimate with Dante. Here especially we must recall Cino da Pistoja (Sinibaldi), a jurist of Siena (died 1336), known particularly to Americans in the tales of Maurice Hewlett. He shows the philosophizing acumen of Dante's school as regards love, becoming most distinctive, however, in his poems on the death of his lady Selvaggia. Petrarch also felt high regard for Sennuccio de Bene (died 1349) and Franceschino degli Albizzi (died 1348), contemporaries of Matteo Frescobaldi, who make up the principal figures in the later period of the school. Petrarch's Latin works, too, show indebtedness to the same religious spirit, the same aprioristic concept of ethics and of the supreme objects of life that we find in Dante. This spirit was producing a rich literature in the fourteenth century. The sermons of Fra Giordano da Rivalto (died 1311) have come down, with the treatises of Jacopo Passavanti, as florid specimens of ascetic eloquence; but richer than these in philosophical depth, classic elegance, and contact with contemporary life are the works of Domenico Cavalca (*Medicina del cuore*, treatises on foolishness, sin, patience, spiritual discipline, etc.). Noteworthy are the letters of the beatified Giovanni Colombini, though far less famous in England and America than the burning religious epistles of St. Catharine of Siena (1340–87) and the *Fioretti* [Little Flowers] *di San Francesco*, a collection of Franciscan legends compiled about 1350.

But there are vast differences between the asceticism of Petrarch and that of these authors or of Dante. Otherworld preoccupations are indeed strong in the poet of Arezzo, but they are combated, as we see not only in the famous *Confessions* but in the *Canzoniere*, by a spirit which is less of skepticism than of intense love of this life itself. Whereas Dante strives to abstract from his love of Beatrice a vision of universal experience and truth, Petrarch is content with the enjoyment and pain of love as a simple human experience; and his sense of the beauties of human impulses as it comes in contact with the ascetic ideals which sought to repress them, and in which as a devout Christian of his own age he believed, creates a mood of tender melancholy, of impatient sensualism, with flights towards exaltation and plunges into profound despair. Historically the most important trait that detaches itself from these conflicting states of mind in Petrarch is his individualism. The *Canzoniere* revealed to Italians the existence and richness of their own individualities. Human emotions came to have a value per se without reference to the perspective of eternity. And this new field of artistic exploitation was made all the more attractive to aristocratic society by his mastery of polite manners, his delicate sense of chivalric gallantry, his urbane banalities, his language, singularly close to the classic Latin, free from obtrusive Tuscanity, and therefore far more cosmopolitan in tone than the picturesque idiom of Dante. With the fourteenth century Italian society was passing from a bourgeois, democratic stage into an individualistic, aristocratic temper. This new society was dominated in poetry by the *Canzoniere* and the *Trionfi* of Petrarch.

Much, perhaps, of this new feeling in Petrarch was stimulated by his passionate devotion to antiquity. As a humanist his part in Italian culture is even greater than his rôle as an Italian poet. He was one of the first to bring into classic studies the critical attitude, reconstituting imperfect texts, weighing conflicting authorities, reconstructing ancient personalities as distinctive psychologies. But especially in his own voluminous Latin works he sets the standard of humanistic Latin composition. Mediæval Latin was in a sense a living language in that it adapted itself to new conditions by enlarging its vocabulary and conforming syntax to the vulgar tongues. Petrarch strives for the purest Latin of the best classic authors, keeping closely to them in locutions, syntax, and vocabulary. This tendency, if it did tend to develop the scientific spirit, nevertheless came to make Latin composition a mechanical mosaic of phrases borrowed from the ancients, thereby stressing erudition over imagination, exalting the grammarian over the thinker, and turning Latin into a dead language.

In political theory there is a distinct break between Dante and Petrarch: the one with his theory of universal empire under God, with his two independent agents, Emperor and Pope; the other characteristically a republican. Dante sees the foundation of the Empire as the beginning of Rome's glory, which for Petrarch ended with the fall of the Republic. But the civic spirit of Petrarch has a much less practical bearing than that of Dante: he is always the visionary, enthusiastic, e.g., at the prospects of Rienzi's republic, or the erudite, who tries in vain to weigh classic memories, as in his pleas to the Venetian Senate, against actual interests of state. For something of Dante's grasp of events we have to turn in the fourteenth century to Dino Compagni (1257–1324) and Giovanni Vallani (died 1348), the vigorous style of which is in strong relief amid the many similar productions of the time, some mere compendia of Villani (Malespini, A. Pucci, Marchione Stefani), others of more personal tone (Donato Velluti, 1313–70), most, finally, of the older mediæval style (Simone della Tosa, *Le istorie pistolese*).

With Giovanni Boccaccio's *Decameron* this, the most glorious period of Italian letters, is perfected. Only in the sonorous involution of his prose—not without tremendous and generally bad influence on later writers—does Boccaccio contribute to the Petrarchian tendency that gradually divorced literature in Italy from fresh contact with life. Appreciated as a genius by Petrarch, he became in his later years one of Petrarch's dearest friends—perhaps the most remarkable relationship recorded between writers of supreme rank. On Dante he published one of the most authoritative of the early biographies. His humanistic work, composed late in life after a deep religious experience, is not of the high quality of Petrarch's and is more mediæval in method and tone. The minor works of his youth, on the other hand, the sentimental psychological romances and lyrics based to an important degree on personal experiences in love, have great interest in the history of literary forms—the prose romance, the pastoral romance, the octave poem, the allegory, etc.—as well as for inherent artistic qualities. From the thirteenth century there continued into the fourteenth all manner of popular tales recited in verse and prose, and from French and Latin this fund of material was being widely enlarged. Important here for the extent and the social significance of their appeal are the vulgarizations of Ovid (e.g., of G. Buonsignori, Arrigo Simintendi, Domenico da Montecchiello, C. Figiovanni, etc.). Domenico Cavalca was epitomizing sacred writings. Filippo Ceffi translated the story of Troy of Guido delle Colonne, Guido di Pisa wrote the "Life of Æneas," Bosone da Gobbio that of Cæsar. Bartolommeo da San Concordio considered with wealth of illustration cases of conscience. Add to these the anonymous *Book of the Seven Counselors* (*Libro dei sette savi*) and the *Libro di Fioravanti*, the latter from the French, and other importations from the romances of the *Matière de Rome la grant*. All this literature shows its effects in the earlier productions of Boccaccio, who, in this regard, finds his nearest rival in Antonio Pucci, though Pucci is essentially a popular and Boccaccio more of a court writer. But the interest of the *Decameron* is far different and greater. Its dominance in Italy as the model of prose writing, its almost encyclopædic illustration of the possibilities of situation in story-telling, the far-reaching sources from which it was drawn, its reflection of contemporary Italian manners and life, all give it great historical importance. But, writing with the clearest powers of visualization, Boccaccio has created therein characters that are alive and complete in their reactions to situations that occur in the lives of all humanity. In this sense Boccaccio, in his own world, is as great as Dante—the world of the everyday life of Florence, minutely objectified by the artist and as frankly described with a sense of humor that dominates everything, even the sense of pathos which is the important undertone in the *Decameron*.

In his reflection of private life Boccaccio is the most brilliant example of an important tendency in this literature of the fourteenth century. An occasional flash of Boccaccio's manner appears in his imitator, Franco Sacchetti (1330–1400), who has left some proverbial types in Italy: Basso della Penna, symbol of the *loica piacevole*, or stickling on literal meanings of words, Dolcibene, the practical joker, and Gonnella the buffoon. Other imitators of Boccaccio are Giovanni Fiorentino in the *Pecorone* and Giovanni Sercambi (1347–1424), who was utilized by Shakespeare. Pieraccio Tedaldi (c.1300–1350) is remembered best for his satires on matrimony, just as Cecco Angiolieri, earlier in the century, expressed in eternal form all the rebellion of wayward youth against parental authority. So Alessio Donati, Francesco Landini (1325–97), Antonio Pucci, Pietro Fattinelli, in their verse and prose, help to complete the picture of that social order which soared to paradise with Dante and laughed and tippled in brothel and wineshop with Boccaccio—just as its chivalric aspects appear in the beautiful *Months* of Folgore di San Geminiano and its national aspirations in the lyrics of Fazio degli Uberti (Pisa), Francesco di Vannozzo (panegyrist of the Italic ambitions of the Visconti), Antonio Beccari (1315–63), a whimsical genius who boldly substituted the worship of Dante to that of Christ, Simone Serdini (1360–1420) from Siena, not to speak of local groups, the Venetians (Giovanni Quirini) and the Aretines (Braccio Bracci). In this minor production of the trecento (fourteenth century) it is worth while to mention several poetic forms that have become famous: the *cantari* (narrative ballads) illustrated particularly by Pucci and Piero Caterino da Siena; the *serventesi*, verse in the general rhyme scheme AAAb, BBBc (11 and 7 syllabled lines), used in poetry of occasion; the *frottole* (irregular poems using great variety of verse length: 11, 7, 5, and even 3 syllables). And especially in popular literature we find the lament, the prophecy, the legend, the *novella* (tale in verse or prose), the *noie* (Provençal *enuech*), humorous satires on the petty irritations of life, cultivated especially by Pucci, the *caccia* (hunt), a variation of the *frottola*, not to omit the chivalric romance destined to such glory later, and in dramatic literature the *lauda* that in the next century was to attain the splendor of the *sacra rappresentazione* of Florence.

The Renaissance, heralded by Petrarch and Boccaccio, becomes all-important in the fifteenth century, when the humanists, aided by the recently invented printing press, diffused a knowledge of the literature of ancient Greece and Rome through the length and breadth of the land and ultimately through the whole Occident. Florence is still to the fore in this period, but there are now other important centres of learning and literary productivity, such as Naples, where the house of Aragon ruled; Ferrara, where the dukes of Este were the patrons of men of letters; Rome, Mantua, Venice, Bologna, and Milan. In other words, although the Florentine influence still remained predominant, the literature of this period is more truly a national one in that it is not confined to a single region, but comes into being all through the peninsula. Here we cannot enumerate the many writers engaged in translating from Greek and Latin or writing only in the latter language. The connecting link between them and Petrarch is Coluccio Salutati (1331–1406), the leading figure in the first generation of humanists, in whom mediæval forces, as regards methods and ideas, are strong. In the first half of the century scientific classicism triumphs in Poggio Bracciolini (1380–1459), Niccolò Niccoli (1364–1437), Leonardo Bruni (1370–1444), and Antonio Traversari (1386–1439), all working principally in Florence, where Cosimo dei Medici was laying the groundwork for the brilliant tyranny of Lorenzo the Magnificent. Outside of Tuscany we have the Istrian Pier Paolo Vergerio (1370–1444), Antonio Loschi (1360–1441) at Milan; from Bergamo came Gasparino Barsizza (1359–1431), and from Verona, Vittorino da Feltre (1378–1446). It is not only that in these men the passion for antiquity becomes dominant over everything else, but that passion comes in their followers to modify the whole view of life. Pagan ideals assail Christian ethics, and a sensuous and elegant æstheticism replaces the ascetic aspirations of the previous age. Scientific research calls in question the documentary bases of religion. More than one humanist actually laid aside his faith. In letters, humanism at first aggressively despised the traditional literary forms of the vulgar tongue, leveling an attack even at Italian itself. But the popular traditions soon asserted themselves against this aberration: the *certame coronario* (poetic competition) of 1441, in which even humanists (Leone Alberti, Leonardi Dati) participated, signalized the reconciliation between Italian and Latin letters, though the classic spirit was destined to dominate productions in the vulgar tongue for generations.

In fact the Italian literature of this century shows much the same happy compromise between the old and the new that we see in painting and sculpture. The ancient dramatic *lauda* takes on a classic brilliancy in the sacred representations of Lorenzo il Magnifico, while the same popular form clothes the purely classic *Orfeo* of Poliziano. Meanwhile in the universities and courts the scholars were examining the memories of the ancient stage, and Vergerio, Bruni, Alberti, and others were writing plays in Latin in imitation of Seneca and Plautus, whose actual works were occasionally reproduced before audiences—all this preparing the way for the imitative erudite comedy and the classic tragedy of the following century. Similarly the chivalric romance, which had thoroughly Italianized itself in the readings of men like Andrea Barberino (c.1370–c.1432), passes from the purely popular style of the *Reali di Francia*, *Rinaldo di Montalbano*, *Buovo d' Antona* to the artistic elaboration of the *Morgante maggiore* of Luigi Pulci (1432–84). Here Pulci preserves much of the naïve, elementary exuberance of the popular legends of Charlemagne, but as a man of the elegant world he laughs at his own creation throughout, so that his work remains as a masterpiece of humorism. Humor, too, is an important motive in the *Orlando innamorato* of Matteo Maria Boiardo (1434–94), but his view of the subject is essentially different from that of Pulci. On the Carolingian materials he grafts the spirit of the legends of the Round Table: the love motive comes into the foreground and with it richer psychological exposition. Classic allusions bedeck his octave stanzas with reminiscences and imitations of beautiful passages in the Latin poets, and a savor of actual life pervades his poem from his use of frequent situations from the very human popular tales. All this is to suggest the method, as indeed to furnish the subject matter, of the great masterpiece of Ariosto a half century later. The lyric also shows progression, for it is the skilled humanist Leonardo Giustiniani (1388–1466), who, in the popular forms of the *strambotto* and the so-called *giustiniane*, strikes some of the sweetest harmonies in Italian poetry. In this century, however, we begin the series of the famous Italian learned ladies with Isotta Nogarola (1418–66), Costanza Varano (1426–47), and, most famous of all, Cassandra Fedele (1465–1558), all of them humanists and pedants, all of them frail attempts to incarnate the new spirit of idealism that was growing in the aulic views of woman. The manifesto of this idealism was Gerolamo Benivieni's *Canzona dello amore celeste et divino* (1488), pedantically illuminated by the notes of Pico della Mirandola and inspired by the Platonism of Marcilio Ficino (died 1499). In one of its aspects this revival of Plato represents a healthful reaction against the dead codifications of the mediæval theology of the Aristotelians. But in its reflections in polite society—the society of eleemosynary poets and idle courtiers—it becomes merely the cloak for a sophisticated and hypocritical sensualism, from which only the French Revolution could free aristocratic Europe. The love lyric follows woman into this atmosphere of denaturized love, and the great master is Petrarch. Petrarchists were Antonio Tebaldeo (1463–1537), Serafino Aquilano (1466–1500), Cariteo (Benedetto Gareth, 1456?–1514), and Bernardo Accolti; and Petrarchists with different degrees of nearness but of similar insipidity will be all the Italian lyrists for three centuries thereafter. It is true that in the preciosity of this age there were elements of seriousness—respect for intellect, admiration of wit, love of social grace; and some even of its deeper emotional moods are present in the *Arcadia* of Jacopo Sannazaro (1458–1530), which has great historical importance as a mirror of its time, though it remains for our age one of the dreariest books in Italian literature. This pastoral romance tries to create the mood of naïve simplicity—one of the hypocritical ideals of this age sated with refined splendor.

It is perhaps by reaction from this aristocratic delicacy that the popular literature presents almost a studied coarseness, as in Burchiello (1404–49) singing with special gusto of "fleas, bedbugs, and many lice" in a cryptic dialect now unintelligible. This burlesque poetry had numerous cultivators (Alessandro Braccese, T. Baldinotti, Luigi Pulci, Matteo Franco), of whom the most famous for variety of subject and vividness of observation is Pistoia (Antonio Cammelli, 1440–1502). Some of Boccaccio's malice, if not of his power, runs on in the *novella* (tale), which counts among its principal exploiters Poggio Bracciolini (*Liber facetiarum*), Giovanni Mainardi (1396–1483, *Le facezie dell' Arlotto*), Gentile Sermini, Masuccio Salernitano, Sabbadino delli Arienti, and Antonio Manetti (*Novella del grasso legnaiuolo*). Whatever the inclinations of the humanists towards skepticism, there was no dearth of religious literature, whether in prose (Feo Belcari, 1416–84) or poetry. This was the age of Savonarola (1452–98). But read the *De partu virginis* of Sannazaro, the sacred poems of Filelfo, of Jacopo Gradenigo and Candido Buontemponi, and the extent of the transformation of the religious consciousness from the time of Dante will become apparent.

As regards mental temper, the quattrocento best reveals itself in Lorenzo Valla (1407–57), a mind inquisitive, hostile to tradition in science, philosophy, and literary scholarship, original in every sense, and finding a permanent place in the history of civilization from his attack on the principle of authority. So also the best illustration of its æsthetic temper might be found in the personality of Lorenzo il Magnifico, especially in the *Stanze per la giostra*. The cinquecento (sixteenth century) continues and develops the preceding age in all its essential characteristics, but with an intellect more aggressive and conscious of its own power. Machiavelli deliberately sets aside the search for conditions that "the imagination might conceive as ideal"—thus he disposes of the otherworld morality of Dante—and seeks in "facts as they are actually observed" the laws to govern conduct in statecraft. Leonardo da Vinci abandons memorization of the physics of Aristotle for actual studies from nature. Pomponazzi considers not the immortality, but the mortality, of the soul. From an obscure monastery near Naples, Giordano Bruno disputes the triune nature of God and goes on to the acceptance of the Copernican system. The spirit of religious reform comes over the Alps from Germany and flames in Naples, Ferrara, and Lucca. Catholicism itself is overhauled and repaired, receiving a new ardor in Vittoria Colonna, a new austerity in the order of the Capuchins, a new and encyclopædic intellectual outlook in the Italian counter-reform that crystallizes in the Council of Trent.

The cinquecento had a predominating admiration for the active intelligence and for originality. But if this spirit led on the one hand to the experimental method, it was conditioned on the other by its too eager expression in erudition and its tendency towards generalization. In literature we find an outreaching to embrace the whole of life, but at the same time a growing belief in definite absolute forms capable of definition both as to their essential character and as to the means of attaining to them. *Arte* came to have a precise meaning, "the way of doing things," and it was the function of the *ingegno* "constructive intelligence," which was a purely intellectual faculty. Aristotle furnished the limits of these forms, and the rules of the *arte* were deduced not only from ancient theorists (Aristotle, Horace), but from classical authors who were presumed to have applied them (Homer, Vergil, Seneca, Plautus). Latin and Greek literature presented, accordingly, forms that appeared fixed and language that appeared regular, or at least reducible to rules. If the quattrocento had vindicated the right of Italian letters to exist side by side with the classics, the cinquecento had to demonstrate that Italian literature should be evolved along the same lines and the Italian language restricted within the same grammatical categories. Thus came about the triumph of classicism in æsthetics and of preceptualism in language, and the aggressive originality of the cinquecento mind spent itself in ingenuity of imitation with Dante, Petrarch, and Boccaccio as models, instead of rushing out, as did the Romanticists of a later age, into all the infinitude of human nature.

So the sixteenth century, which believed in the *genres*, marks the appearance of regular epics, regular tragedies and comedies, regular lyrics, and even its best thought comes to express itself in the Platonic dialogue. Of all this production, most brilliant is the chivalric epic, relatively free from the disturbance of classic rules in Lodovico Ariosto (1474–1533) and consciously regular in Torquato Tasso (1544–95). Ariosto's *Orlando furioso* marks the apogee of chivalrous poetry in Italy. Starting where Boiardo's *Orlando innamorato* ends, and presupposing that the reader is acquainted with the story there unfolded, Ariosto develops still further the love affair of Orlando and Angelica, interweaving with it many other romantic episodes, especially that of Ruggiero and Bradamante. For his idealistic, ethical subject matter Ariosto is indebted to French poems and romances of the Middle Ages, to Latin classic verse, and to Italian writers of the Renaissance period; but he is most original in the way in which he has breathed new life into the old material, analyzing in various moods, pathetic, humorous, sensuous, ribald, the various reactions of humanity to love. His style has a charm due in no slight degree to the skill with which he has combined the pomp of classic diction with a simplicity of expression peculiarly his own, and his versification is satisfactory because of the ability with which he has handled the *ottava rima*. Ariosto had many imitators, but their poems, like that of his predecessor Boiardo, are now little read. Several attempts were made to remodel the *Orlando innamorato*, the most successful being that of Francesco Berni (c.1497–1535), a master of style.

Ariosto's contemporaries, who were entranced by his genius, were, however, not slow to perceive his "irregularity." To avoid this fault was the purpose of the critic Gian Giorgio Trissino (1478–1550) in his *Italia liberata dai Goti*, the first classic epic, which scholars remember for the perfection of its regularity, and which every one else has forgotten for its perfect insipidity. Through the *Amadigi* of Bernardo Tasso (1493–1569), the *Girone cortese* of Luigi Alamanni (1495–1556), the *Ercole* of Giraldi Cinthio (1504–73), we arrive at the *Gerusalemme liberata* of Torquato Tasso, the son of Bernardo, the greatest Italian writer of the second half of the sixteenth century, who sums up many of its tendencies and creates much of the mood of the two following generations. A man of extraordinary genius, which reveals itself in all his works, as well in his masterpiece, *La Gerusalemme liberata*, as in his lyrics, dramas, dialogues, and letters, he suffered at times from a mental disorder which, though it necessitated placing him under restraint, did not impair his literary productivity. His poem, *Rinaldo*, is a youthful work of the category of chivalrous poems, dealing with the adventures of the Carolingian hero Renaut de Montauban. But Ariosto had uttered the supreme word in chivalrous story, and Tasso was to gain his laurels by perfecting a new *genre*, that of the crusading or Christian epic. This he did with his *Gerusalemme liberata*, a poem of markedly serious intent, primarily concerned with the Crusades in which Godfrey of Bouillon played a part. The author did not disdain to admit as subordinate elements certain features of the chivalrous romance, especially in connection with the love episodes, just as he also drew from his favorite authors of classic antiquity. Like Ariosto, whom he resembles very much in his imitation of passages of ancient writers, he uses the *ottava rima* with ease and grace. An individual note in Tasso's work is that of melancholy, which, springing in several episodes (*Sophronia*, *Clorinda*) from the juxtaposition of love and death, is really an echo of the man's personal experience and of his mental anguish. Nevertheless, in its most characteristic aspects this epic interprets with masterly vision the highest religious aspirations of the Italian counter-reform, and the poem is otherwise remarkable for the sustained dignity and poise of its execution. Although contemporaries, like posterity, applauded the *Gerusalemme liberata*, Tasso was not satisfied with his work, and, yielding to religious impulses of an ascetic nature, he published a remodeled form of it, *La Gerusalemme conquistata*, which is much inferior to the original poem and is, therefore, neglected, while the *Gerusalemme liberata* remains dear to the whole Italian people.

In lyric verse the impulse of the sixteenth century towards originality declared itself in revolt against the too conventional nature of the Petrarchistic verse of the preceding period. In his *Rime*, Pietro Bembo (1470–1547) showed how better results could be obtained in lyric song by going directly to Petrarch for inspiration, and Bembo's example was followed by a host of poets. But the true animus of the Bembistic reform is made apparent in his *Prose della volgare lingua*, where he stresses the importance of having a general literary speech for the land, that unity of style may be attained and the character of the literature be made national. This he does by promoting the theory or rigid classicism on the basis of imitation in general and of Dante, Petrarch, and Boccaccio in particular. Bembo's charming personality, his exalted ecclesiastical rank, his powerful friendships gave his ideas great weight. Their culminating triumph appears in the manifesto of Arcadia nearly two centuries later, where the whole devastating force of his doctrine becomes apparent in the motto "not nobility of substance, but excellence of imitation." Central in Venice, Bembo's native city, and in Urbino, where he long resided, this movement caused a revived worship of Petrarch which amounted almost to a religion. Its earliest and most distinguished poetic converts were, in Venice, Domenico Venier (1517–82), Girolamo Molin (1500–69), and Bernardo Capello (1498–1566). But the fervor spread generally through the peninsula. The vast mass of production in verse that ensued—mediocre always and generally arid—need be mentioned only in some of its curious manifestations: the *centoni*, patchwork poems, made entirely of verses of Petrarch rearranged; the "replies of Laura," imaginary answers to each of Petrarch's sonnets; the *spiritualizations*, in which, in tone with the Catholic reaction, the earthly love of Petrarch is retreated, sonnet by sonnet, as of religious character and import. Typical authors are Angelo di Costanzo (1507–91) and Bernardino Rota (1509–75); less typical, for an occasional flash of originality, are Luigi Tansillo (1510–68), whose verses were plagiarized and "philosophied" by Giordano Bruno, Galeazzo di Tarsia (1520–53), Cardinal Giovanni della Casa (1503–56), and Annibale Caro (q.v.). On a solitary eminence for a lyric expressing his own vigorous personality is Michelangelo Buonarotti (1475–1564), and with him is associated, for a tender and beautiful friendship, Vittoria Colonna (1490–1547), the death of whose husband, the Marquis of Pescara, inspired in her a poetic vein remarkable for its religious intensity. In this Petrarchistic movement the learned woman stands out even more conspicuously than in the preceding century: Laura Terracina, Lucia Bertani, Laura Battiferri have been forgotten beside the happier fortunes of Tullia d' Aragona (1506–56), Veronica Franco (1546–91), courtesans both, and of the gentlewomen Veronica Gambara (1485–1550), Gaspara Stampa (1523–54), and Barbara Torelli. The Platonic idealism which accompanied and glorified for its authors the Petrarchistic conception of love and which expresses itself most tritely in the *Asolani* dialogues of Bembo, most subtly in the *Dialogo di amore* of Tullia d' Aragona, and most philosophically in the *Eroici furori* of Giordano Bruno, had a strong appeal for all the aristocratic circles of Europe. Its influence appears in the poetry of the *Pleiade* (Ronsard, Du Bellay, De Baïf, Saint-Gelais) in France, of Juan Boscán, Garcilaso de la Vega in Spain, of Francisco de Sâ in Portugal, and of Wyatt and Philip Sidney in England. There were, to be sure, some discordant voices in this Petrarchian adoration: Giordano Bruno, who rebelled against everything, rebelled against this also, but his genius had no special fecundity in verse; Pietro Aretino satirized the new movement with some positiveness; Antonio Broccardo, with an admiration for the popular poetry of the quattrocento, and, more deliberately, Cornelio Castaldi, lacked only genius in their reactions against it in verse. The revolt that manifests itself in the attempts to revive Latin and Pindaric metres—the blank verse of Trissino, the odes and *selve* of Bernardo Tasso, the elegies of Ariosto, B. Tasso, and L. Alamanni—was scarcely thoroughgoing, inasmuch as it too was a form of imitative classicism.

Towards the century's end lyric verse runs completely into a slough of despond, when, with the Catholic reaction losing its fervor and tending towards a caducous conventionalism in faith, poetry is turned largely into religious channels. But this verse belongs in spirit to the age that follows. For the best work in Italian poetry, if we wish to leave the masters Ariosto and Torquato Tasso, we must turn to the burlesque and the satire, to the irrepressible laughter of Francesco Berni (1497/8–1535) in his jocose sonnets which created the style called *bernesque*, or to that of his imitator Anton Francesco Grazzini (called *Il Lasca*), the first in a long series of *bernesque* poets (Giovanni Mauro, Gianfrancesco Bini, even Tansillo and L. Dolce), worthy all, to adapt a phrase of Pietro Aretino, of crowns "of four kinds of sausages." Teofolo Folengo (1496–1544), immortal under his pseudonym Merlin Cocai, and for his numerous affiliations with Rabelais, is in a different category; for in his Latinized Venetian-Italian, called *macaronic* Italian (or Latin, as you will), in his rollicking *Baldus*, followed in joyous succession by the *Zanitonella*, the *Orlandino*, the *Chaos del Triperuno*, the burlesque epic is informed by a spirit of deep artistic seriousness and no mean ethical ideal, which was notably lacking in the *pasquinades* of Pietro Aretino (1492–1556), a curious specimen of the cynicism of this period, who achieved fame in this type of epigram (so styled from the statue of Pasquino in Rome, where they were posted as public libels). The *pasquinades* of Italy, collected by the German Ulric von Hutten, spread through Europe all the motives of Latin wit and satire, and the ultimate sources of the stock in trade of all modern comic journals are to be found in them. Nor should we, if we seek vitality alone, neglect the narrative verse inspired by the wars against the Turk and particularly by the battle of Lepanto (1570), and, in quite a different field and in Latin, the *Syphilis* of Girolamo Fracastoro (1483–1553), and, to turn to popular poetry, the *canti carnascialeschi*, as well as the *stanze* of the Tuscan Campagna; whereas the definitive value of the classical satire (Ariosto, Pietro Nelli, Luigi Alamanni, Ercole Bentivoglio) is more difficult to fix, since it shows on the one hand all the pedantry of cinquecento classicism, and on the other some of the vigor of the *sermoni* of the fifteenth century, from which, in a certain sense, it springs.

One sad result of the æsthetic theory of the

Renaissance was the contempt of the aristocrats for the old dramatic form known as *rappresentazioni sacre*, which disappeared from the towns in the early part of the sixteenth century and withdrew to the cloisters and the country districts. Its place was taken by prose translations of ancient dramas, which paved the way for Italian imitations of the works of antiquity. The first Italian tragedy, and in fact the first regular tragedy, in all modern literature, was the *Sofonisba* (1515) of Gian Giorgio Trissino. This was followed by many tragedies, one sadder than the other and nearly all modeled on the works of Euripides, Sophocles, and Seneca, e.g., the *Rosmunda* and the *Oreste* of Giovanni Rucellai, the *Canace* of Sperone Speroni (1500–88), the *Orbecche* of Giraldi Cinzio (1504–73), the *Orazia* of Pietro Aretino (1492–1556). Even Torquato Tasso perpetrated the *Torrismondo*, which deals with matter of Germanic origin. Most of the tragedies were composed in blank verse (*versi sciolti*). Something better may be said for the regular comedies of the time, nearly all based on Plautus and Terence, and a few original, which were written sometimes in verse and, more often and more successfully, in prose. The masterpiece among the comedies was the *Mandragola* (1513) of Niccolò Machiavelli (1469–1527). Let us say this in deference to the opinion of Macaulay; and, moreover, the theme of the *Mandragola* has survived to this day as a universal tale. But the *Candelaio* of Giordano Bruno had a literary fortune no less remarkable, as did the *Pedant* of Francesco Belo, the comedies of Pietro Aretino, and *Gli intronati* of the Academicians of Siena. Ariosto, too, is historically of much importance as the first cultivator of the regular comedy and because his *Suppositi* is as little of a mere name as, let us say, *Ralph Roister Doister* in English literature. But read any play you wish of Giambattista della Porta (1535–1615)—the reading will not be entirely wearisome—or any one of the recent Bari anthology (Bari, Laterza, 1912) of cinquecento comedies; there is present there, in an alloy not overrefined to be sure, much of the wit of the *pasquinades*, much of the elementary sense of action that has been the true base of comedy in every age. What is dead, on the contrary, is the Plautan type personage, who substitutes linguistic play for realistic self-revelation. But even these are not entirely dead: the braggart soldier was a distinctive figure in sixteenth century society; the doctor, too, with his colleague the pedant, recurs in life even to-day; and in these written comedies (*commedie erudite* they were sometimes styled) much interest attaches to them from the fact that they are the clearest presentation we possess of similar figures, similar *masks*, who died on the stage of the improvised play (*commedia dell' arte*, professional comedy) with the voices of the actors who created them. The *commedia dell' arte*, which originated during this century, is one of the most important phenomena in the history of the modern theatre. Produced from a simple outline (*scenario*), with lines largely extemporized, though each character had his specialty thoroughly conventionalized, this type of comedy enjoyed in Italy a life three centuries long. In its stock personages—Pantaloon the merchant, Gratiano the doctor, Arlecchino the sly servant, Lelio the lover, etc.—the Italians saw the idiosyncrasies of their varying regional life portrayed, satirized, with a perennial life and humor. Their wandering troops of actors wandered into Spain and France; in Paris they established a permanent theatre; and if not, assuredly, from their philosophic depth, at any rate from their *dramatic* vision, Molière learned his trade as comedian and playwright, and from them sprang in a still more intimate relation the immortal productions of Carlo Goldoni.

Poetry succeeded in expressing possibly some of the moods and certainly all the affectations of the Italian cinquecento. Its real spiritual and intellectual life appears in prose. It is the current fashion of literary historians to ignore thinkers as thinkers; we must ignore the dialogues of Giordano Bruno (1542–1600) as preeminently philosophical and the treatises of Leonardo da Vinci (1452–1519) as predominantly scientific. But somehow the lucid intellect of Niccolò Machiavelli (1469–1527) has made politics a department of literature; since his wonderful style is, after all, only the incisiveness of his grasp of political science, based on a rigidly empirical method, which he applies with merciless disregard of aprioristic ethics to the successful formation of tyrannies in the *Prince* and, with the same merciless disregard, in the *Discorsi sopra la prima deca di Tito Livio*—a work too often overlooked, especially by our own time—to the successful formation of republics. As a historian Machiavelli (*Istorie fiorentine*, *Vita di Castruccio Castracani*) has the virtues and defects of a method: that of writing of facts with a too general regard for their bearing on the principles of conduct in which he is interested. But this method, as followed out by him, has been of inestimable influence on modern thought; for by virtue of it his two principal works are of service to-day, many of his general inferences have withstood the test of modern history, and though Machiavellianism has come to be synonymous with selfish opportunism, Machiavelli, one of those least tainted with Machiavellianism, by directing attention to the materialistic forces that govern human events, established also the study of the processes that control them, and in actual effect has contributed as much as any other modern thinker to all libertarian movements after him. Francesco Guicciardini (1483–1540), in his *Storia fiorentina*, his *Discorso del reggimento di Firenze*, his diplomatic reports, memoirs and critique on Machiavelli, was a more orderly historian and possessed as well most of Machiavelli's ideas, lacking only the emotional fervor and the aggressive intensity of his greater contemporary. Close in their footsteps followed Donato Giannotti (1492–1573) in works on Florence and Venice, which show greater interest in minute details of political history, but less originality and clarity of thought, though something of Machiavelli's spirit. The writings of these men, taken with those of the less powerful Benedetto Varchi (1503–65) and Paolo Paruta (1540–98), an anti-Machiavellian idealist, form the most portentous contribution of Italy to modern thought, the most glorious monument to Italian mentality, of this period.

One other body of prose production has proved scarcely less influential in its own field—that of literary criticism and applied æsthetics. As regards insight into the nature of art, there is probably more value in the first dialogue of Bruno's *Eroici furori* and in a few verses of Aretino than in all the voluminous theoretical production which begins with the *Prose* of Pietro Bembo and the Italian grammar of Fortunio (*Regole*) and runs down through Lodovico Castelvetro (superb as a philologist), Girolamo Muzio, Cinzio Giraldi, Benedetto Varchi (who definitely codified the Italian classic tongue), Sperone Speroni (who was plagiarized by Du Bellay in his famous *Défense de la langue française*), Giovanni Minturno, and Francesco Patrizi to the establishment of the Academy of the Crusca, to the poetic codes of the Academy of Arcadia of the next century, and to Giambattista Vico, the founder of æsthetic science, who wrote in the eighteenth century. The work of this literature we have briefly characterized above; suffice it here to note that it established, one may say, for the whole of Europe, down through Lessing to the Romantics of the nineteenth century, the principles of neoclassicism, which experience has indeed modified in part and even as regards rigorous precept destroyed, but which nevertheless have deeply enough colored the æsthetic thought of the modern world as to resist the assaults of German philosophy and the more self-conscious attacks of our own contemporary Benedetto Croce, the rejuvenator of Vichian æsthetics.

But if we restrict ourselves to the narrower view of belles-lettres, the prose of the sixteenth century is no less remarkable. For here, not to mention Giorgio Vasari's (1511–74) *Lives of the Painters and Sculptors*, we have the autobiography of Benvenuto Cellini (1500–71), an astonishingly frank self-revelation of one of the most interesting of men, a book, moreover, that is even to-day as much read as any other of the century in any language. More academic is the vogue of the *Cortegiano* of Baldassare Castiglione (1478–1529), who there expounds the theory of court taste as the norm of good usage in language, but whose most interesting aspect, aside from the value of his work as a source for cultural history, is in his reflection of the Platonic idealism that lies behind much of the aristocratic poetry and the aristocratic art of his time. Only less comprehensive is the *Galateo* of Cardinal della Casa, which enjoyed an even more extensive fortune as a practical guide to good manners. The tales of Matteo Bandello (c.1480–c.1562) are not without some artistic merit, but their chief value is, again, historical, whether from their reflection of manners or from their influence on later writers (Shakespeare), to which latter consideration the importance of the *Hecatomithi* of Giraldi is almost exclusively due. And much the same might be said of the *Piacevoli notti* of Gianfrancesco Straparola, of Parabosco (*Diporti*), of Firenzuola and Fortini. The *Diaries* of Marin Sanudo (1466–1535) stand, both for substance and form, in a class by themselves. Meanwhile epistolography became in the sixteenth century a fine art, with Pietro Aretino, who in his letters completely exposes the dark recesses of his personality, as a typical example. It is a racier, but no less individual, flavor that we find in the correspondence of Andrea Calmo (1510–71).

It has been the fashion for some generations past to ridicule the manner that rules Italian literature in the seventeenth century, and which has been dubbed with an opprobrious term, *seicentismo*. The unanimity of the lamentation which invariably saluted its mention was only slightly disturbed by the recent publication from Bari (1911) of Croce's *Lirici marinisti*, and perhaps rightly so; for surely it would be strange if, out of the endless flood of poetry from veritably thousands of poets, some 600 passable pages could not be selected. Nevertheless, the phenomena of *seicentismo* have been too summarily derided, as indeed they have been too mechanically explained. Obscenity, arrogance, a lack of logic approaching aberration, hostility to real thought, ponderous and misapplied erudition, slavish adherence to tradition and authority coupled with almost impudent boasts of originality, these are the ethical traits that underlie this century's most distinct characteristic in art: the *concetto*. But this age, which burned Bruno and gagged Galileo, produced also Thomas Campanella and Fra Paolo Sarpi; and if it worked the *concetto* to death, it also invented the telescope and realized the experimental scientific method. It was primarily an age of intellectual unsettling and struggle, full of contrasts in emotion and thought, which in architecture it expressed by adorning Parian marble with the black *pietra di paragone*, and from the gloom of which it took refuge in an unbridled sensualism.

To grasp this age in its historical sequence we must return to the later aspects of the cinquecento: it is foreshadowed, as regards literary technique, in the accentuated preference for antithesis in the style of the *Gerusalemme liberata* and, as regards mood, almost to perfection in the delicate, sophisticated, but none the less intense, sensualism of Tasso's *Aminta*. It is useless to call this the first great pastoral drama; its closest affinity spiritually is found in the *lascivia* (sensualism) of the *Adonis* of Giambattista Marini. So its religious hypocrisy appears already in the pious songbooks of the sixteenth century, and we may begin—if Aretino's asceticism seems sacrilegious—with the *Tears of Saint Peter* of Tansillo. As for literary theory, there is nothing new, save an extraordinary increase in the number of the *genres* and a new statement of an old quibble hacked over as a quarrel between ancients and moderns. So the lyric is subdivided into love, moral, trivial, obscene, piscatory, marinaresque, and forest poetry, and each new *genre* has numerous claimants for the credit of inventing it. Tommaso Stigliani struts about as the first "to sing Spanish deeds in Tuscan accents." Tassoni invents the mock-heroic epic as though Folengo had never existed. Out of all this dross one thing of beauty—the musical drama, the opera, in its special aspect called the *melodramma*, which in music by Francesco Cavalli and Claudio Monteverdi, with librettos by Gian Francesco Busenello and others, still survives. In prose the *concetto* is rampant likewise, rolling out from church pulpit, academic parlor, and senatorial chamber in sonorous vacuity. The comedy sleeps in Cicognini, waiting for Goldoni to make over the *commedia dell' arte* into artistic comedy. The tragedy sleeps even sounder still. What had happened to the vigorous outreaching after life that characterizes the great Italian Renaissance? Some answer: Spanish influence; but Spain owed as much to Italy as did Italy to the Spanish occupation. Others answer: the Renaissance theory of ornamentation as the essence of art; but this theory the cinquecento itself possessed. Others, again: the progressive divorcing of literature and life by theories of imitation, by admiration for erudition, by the establishment of oversophisticated cultural ideals, that operated all through the sixteenth century. Others, finally: the Italian counter-reform in faith, the very rigidity of which stifled individual religious feeling, rewarded demonstrative hypocrisy, and generally tended towards ritualism and formalism. There is some truth in all of these explanations and much in their combined effect. Except that *seicentismo*, as a manner, is not confined to the Italian seicento: it is paralleled in the preciosity of France, the Gongorism of Spain, the euphuism of England. It breaks out in late Latin literature, in mediæval poetry, in Persian poetry, in folklore of all ages and peoples—all of which suggests that *seicentismo* is a phenomenon recurring in a certain set of intellectual circumstances, of which perhaps the most cogent trait is the restriction of the intellectual outlook by dogmatic boundaries of various, of any kinds, which force the aggressive mind to turn inward upon its own past achievements instead of going on to new discovery, and thus substitutes ingenuity of recombination for creative originality.

Let us ignore for the seicento the literature that merely repeats the previous age: the numerous followers of Tasso in the epic—of Tasso who reigns in the seventeenth and eighteenth centuries, as had Petrarch before him; the thousands of Petrarchists of varied hue of doctrine; the hundreds of academies, all equally pretentious and equally insipid; the hundreds of playwrights, of whom scarcely one, save here and there a brilliant extemporizer of the Andreini family, feels a breath of life; the petty polemics of myriad critics equipped with astonishing erudition and equally astonishing lack of common sense. For the seicento did a few things well. It enjoyed Gabriello Chiabrera (1552–1638), who left some enduring flashes of tenderness in his *canzonette*, though a pedant in his metrical exercises in classic forms. It understood and visualized every phase of sensualism, as witness the brilliant production and the interesting career of Giambattista Marini (1569–1625), author of the *Adone*, which his age, with the reserved assent of posterity, has called the "marvelous poem." It surprised itself in producing one litterateur of serene intellect and sober judgment, Trajan Boccalini (1556–1613), whose *Dispatches from Parnassus* are a classic of humoristic social, political, and literary criticism. Its humor, in fact, is as vital as its sensualism: it is still possible to read the *Rape of the Bucket* of Alessandro Tassoni (1565–1635), whose national spirit burns nobly in the *Philippics* against Spain, and who illustrates the curious mental perversity of his age in his *Pensieri diversi*. While Galileo was breaking ground for Isaac Newton, Francesco Redi was founding modern bacteriology in his studies on parasites (1626–98), and Fra Paolo Sarpi (1552–1623), author of the fundamental *History of the Council of Trent*, was establishing with definitive precision the legal relations of church and state, sustaining laic jurisprudence against an effete canon law, vaunting freedom of speech against ecclesiastical interference. What of the tyrannical rationalism of Tommaso Campanella's (1568–1639) *City of the Sun*, the manifesto of a socialistic communism? In it as in his stately verses there is something of the emancipated intelligence which the pyre of Bruno could not destroy. Dialect literature never quite lost its intimate touch with reality in Giambattista Basile, in Maggi, in Busenello. Historians of art assert that out of the florid, the exuberant experimentation of the roccoco style, so absurd in itself, sprang much of the discovery of modern technicians. So underneath its grotesque literary expression one feels in the seicento an impatient, a palpitating, however disoriented, intellectual vigor. It comes to the surface in these men, of whom any age might well be proud, whom the seicento even admired, but whose trail it refused to follow in order to give birth with volcanic contortions, to that mouse of literature, the Academy of the Arcadia.

Christina of Sweden founded it in 1690 around the elegant personalities of Giovammaria Crescimbeni (1663–1728) and Gian Vincenzo Gravina (1664–1718), the latter, in his way, no mean thinker. It aimed to react against *seicentismo*, a term which its later devotees invented, as illustrated in the followers of Marino; it actually clarified the atmosphere of the final manifestations of Petrarchistic idealism, now at last running in decadence to expire in the French Revolution. Its mood may be described best in its method: if the lover fixed his eyes on eternity and filled his mind with platitudes on divine love, he could attain to the maximum of sense stimulation with a modicum of sex indulgence. This is the spirit that finds its social reflection in the institution of *cicisbeismo*, the system of the serving cavalier and Platonic soul mate, which needed constant demonstration to itself of the truth of its idealistic convictions, by daily seeking out the temptations of the boudoir, which, as is asserted and as a little good will may readily believe, they successfully resisted. Once more in Italian poetry—flaccid echoes of the age of Dante—we find ladies angelified, descending from heaven to lift the humble lover to an exalted eternity. There is the quintessence of gallantry, revealing itself not in the bald superlative of the duecento, but in an involved intellectual tour de force that shuns every shock of crudity, every suggestion of materiality. Meanwhile the vocabulary of Petrarch and the sixteenth-century poets (and grammarians too) must be learned by rote; every head must be stuffed, till it could hold nothing else, with classic quotations; no gentleman worthy of the name but could give offhand any rhyme series in Italian with completeness. So Arcadia, which bridges the seventeenth and eighteenth centuries and becomes predominantly typical of the latter, marks the age of facile composition and—to us miraculous—extemporization; for could not Corilla Olimpica (Maria Maddalena Morelli) treat offhand and viva voce in any metric form any problem from the nature of God to whether feather beds are more conducive than beds of straw to the attainment of a well-ordered temperament? No age, not even the cinquecento, ever laid greater store on cleverness. Fortunes were won by a witticism and careers were made with a sonnet, as well as ruined by a single faux pas. Let us bundle together here the Perfettis, the Bertolas, the Crudelis, the Frugonis. The Arcadian virus was both fertile and tenacious. Even Vincenzo Monti, in an age that ought to have known better, began in its manner, as did the Metastasios, the Goldonis, the Gozzis, the Parinis. Let us signalize only Jacopo Vittorelli, at once typical and individual, for the melancholy sweetness of his Anacreontics to Irene.

For the eighteenth century in Italy looks not only backward to Petrarch, but forward to Napoleon Bonaparte. And this renaissance of mentality appears even in some of the traditional literary forms. Or rather, if not mentality, it is at least a clear artistic vision that comes into the melodrama with Apostolo Zeno, a fine scholar and a fair poet (1668–1750), and in that most settecentistic of all the writers of the settecento, Pietro Metastasio, who, discovered by Gravina, was supported by Marianna Bulgarelli, who carried the splendor of Italian poetry to Vienna as court dramatist, who in his serious melodramas shows the utter inability of his century to be serious, and finally leaves to the folk music of Italy many a melancholy or sensuous air culled from his opera librettos. The *Didone*, the *Clemenzia di Tito*, the *Attilio Regolo*, even the *Siroe* with its involved intrigue, are, in their genre, masterpieces, not of the gigantic outlook, but of the delicate sentiment, intensely felt, perfectly apprehended by the creative spirit. Dignity, if not compelling passion, sustains the classic tragedies of Scipione Maffei, especially the *Merope*, well worthy to stand beside Racine's better, and above Voltaire's best, dramatic poems. Pier Jacopo Martelli (1655–1755), imitating the French Alexandrine verse, hits on the languid yet fecund rhythm of the 14-syllabled *martellian couplet*, which has ever since resounded on the Italian stage. Jocose poetry, too, sensed from a distance the new burst of life, though none will exaggerate the value of Forteguerri's *Ricciardetto* or of Casti's *Animali parlanti*, both famous enough in their own day. But the Bernesque poetry of the settecento has too often behind it the spirit of gossip and malice, not the animal violence of the sixteenth century or of Boccaccio. A gossip was Bartolommeo Dotti, a tattletale was Pietro Buratti, and is even Carlo Gozzi any too free from such things? Meanwhile, even in the most reactionary writings, the spirit of rebellion rumbles: there is an aggressive tone in the reactionary *Lettere Virgiliane* of Saverio Bettinelli; the *Granelleschi* of Venice, in their defense of antiquated forms, had, in the nature of things, to be fighters; and Carlo Gozzi, to demonstrate the value of the old, has to give it a novelty that in his *Fiabe* (folklore dramas) has a vitality as fresh in the Germany of the nineteenth century as on the New York stage in 1914.

In contradistinction to the monotonous mediocrity of the seicentisti, towards the end of the eighteenth century strong personalities begin to come forward. There are the adventurers, with lives more involved in reality than romance would dare invent in fiction. Lorenzo da Ponte slept with beggars and stood before kings, got a living on his wits, and died at peace, a professor in Columbia University. Giacomo Casanova, genius that he was no less in swindling than in love and literature, saw every grade of fortune and every recess of life in the gay century which he portrays with photographic accuracy in his memoirs. His autobiography is more interesting simply in quantity and scope of experience than that revealed in the *Memorie inutili* of Carlo Gozzi and the memoirs of Goldoni. Giambattista Vico (1668–1744) has had to wait till the twentieth century for the recognition of the originality and intrinsic worth of his *Scienza nuova* in the fields of anthropology, æsthetics, and sociology. The Christian socialism of Antonio Muratori (1672–1750) is less important than his scholarship in the *Rerum Italicarum Scriptores*, a work more vast surely, but certainly not more useful, than Forcellini's Latin lexicon, in which Zeno, Maffei, and Muratori all had a hand. England for a moment seemed disposed to hang Giuseppe Baretti (1719–89), to whom it came to owe some insight into Italian culture. Baretti is one of the first critics in the modern sense, fighting in his *Frusta letteraria* the vacuities of Arcadia, hailing the return in literature to serious substance, and hitting on moments of definitive vision in his artistic appreciation. Gasparo Gozzi (1713–86), in his *Osservatore*, was a follower of Addison, more tainted than Baretti with tradition, but nevertheless quite as gifted with common sense; and the changing mood of the century is apparent especially in his *Difesa di Dante*. This return to the spirit of the Middle Ages is paralleled by a whole movement towards *exotism:* some interest is manifested in German poetry, the relations with France become extremely intimate; most important of all, Melchiorre Cesarotti (1730–1808) translates Ossian (Macpherson) from English, and in him the first seeds of Italian romanticism are sown. The French philosophic spirit was more immediately productive: it appears particularly in historical writing, in the attempt to organize all human experience, as revealed in jurisprudence, governmental forms, the arts and sciences, manners and customs, into logical, coherent systems with fixed universal principles. This method, which is after all a retrogression from Machiavelli's empiricism, goes often astray in Gravina (*De Origine Juris*) and is too mechanical even in Giannone (*Storia del regno di Napoli*); but from it Vico derived much of his impetus, and it produced that most human of all libertarian documents, the *Treatise on Crimes and Punishments* of Cesare Beccaria. This work grew out of the vigorous intellectual movement in Milan, central in the group which edited the *Caffè*, of which the public-spirited Alessandro Verri, author of *Le notti romane*, was a leading figure.

But Goldoni, Parini, Alfieri—in these names the Italian eighteenth century was crowned and epitomized. The smile of Goldoni belongs as much to America as to Venice, his native city. For Mirandolina has charmed us in the creation of Mrs. Patrick Campbell; Giannina has rippled and pouted from many a university stage; and now the most comprehensive production in the literature around Carlo Goldoni has come from Chicago in the biography written by Mr. Chatfield-Taylor (New York, 1914). Goldoni's plays, unsubsidized by the academic world, are more often acted on their own merit than those of any author anterior to 1800. In them there is much of the old: Goldoni's comedy gushes florid from the essence of the *commedia dell' arte*, but Pantaloon incarnates the morality of Venice and the good sense of all the world. Goldoni is best, to be sure, in his native element, the life of the lagoons, which he seizes in its characteristic traits and portrays with brilliant reality. *I rusteghi, The Quarrels of Chioggia, Sior Tonin Bonagrazia, Noble of Torcello, Le donne curiose* (this too an American favorite) are his most genial inspirations, but *The Liar* has a perennial vogue. *The Family of the Antiquary, The Mistress of the Inn, The Café, The Friend, A Strange Occurrence*, while they show little of Molière's philosophic grasp of life—the comparison, after all, is unfair to both—possess an even superior excellence of visualization, of characterization. In this respect Goldoni overshadows all his predecessors and obsesses perhaps to an excess the next generations of comedy in Italy. His conscious fight for the comedy of character—so misunderstood by the Gozzis, the Pietro Chiaris, the Granelleschi as a group—did not, after all, destroy the *commedia dell' arte*. What it did destroy, and effectually, was the classic imitative comedy; the popular extemporized play, rather, it transformed with a serious purpose and vivified with a transplantation of its roots into the fresh ground of observation of life. In this sense Goldoni fulfilled, rather than betrayed, the promise of the *commedia dell' arte*.

In Goldoni's lashing of aristocratic vices and his propaganda for middle-class virtues some have seen the rise of a revolutionary consciousness. Goldoni himself would have been shocked at this interpretation of his work. His satire is the reaction of common sense to social phenomena as they are; and in this respect he is like another good-natured and frank-souled contemporary, Giuseppe Parini (1729–99). Surely the social cancer that the French Revolution was cutting out with the sword was never explored with a more cutting probe than in the *Giorno* of this Milanese cleric. But, again, it is rather a clear and sincere confidence in the ethics of the past than a programme for actual reform that we have in this vigorous satire. Parini, in fact, was taken completely aback by the storm that swept across the Alps. And in the midst of the turmoil of 1797 he fled with a sigh of relief to the academic harmlessness of his sculpturesque odes, dictating the lines of mellow sadness to the *Inclita Nice*, and returning with delight to the classic imagery of *L' Educazione*. Vittorio Alfieri was, on the other hand, a fighter, as witness many a passage in the *Misogallo*, the autobiography, and his classic tragedies themselves. His dramatic works for a half century taught to Italian youth hatred of tyrants and love of liberty and justice—emotions that to us have become both unimaginative and trite in their more universal forms. As unimaginative and trite we should probably now characterize much of Alfieri's work. *Saul* alone has passed, with a few lyrics, into world literature, for its noble and stately portrayal of a soul that, through sin or error, has lost its grip on life and stands face to face with a self-created despair.

Napoleon's proclamation of Rimini in 1797 brought Italians, as from a dream of idleness and gayety, into the tragic reality of a new order of things. And the dominant question was what, as Italians, they were going to do about it. Vincenzo Monti (1754–1828) was one of the many not ready with an answer and one of several distinguished intellects who never really found a satisfactory one. His panic-stricken disorientation, that appears in his life, shows also in his literary work, largely indebted to Arcadia, now rushing out to the Napoleonic vision, now reacting against Revolutionary excesses, settling down finally to a contemplation of democracy, but feeling most safe in the uncompromising atmosphere of classic translations. Himself quite satisfied with escaping unharmed, his vacillation was rewarded with a reputation for exquisite artistry in his tragedies, in the satirical *Bassvilliana* and his version of the *Iliad*. Stendhal, better than any one else, has understood the conflicting trends of feeling at this period. What we see in his *Letters from Rome, Naples, and Florence* is a society passing from a static, gay, complacent, aristocratic system to the tumultuous aggressiveness of an ambitious middle class. A giddy intoxication overcame the suppressed social strata with the first descent of Bonaparte, but after Waterloo came the restoration of the old régime. The national consciousness was strong, but its hopes had been cruelly deluded. It is this hope and this delusion that give distinctive character to Italian literature in the first half of the nineteenth century.

Its production was vast and much of it has a cogent vitality. But its most dominant tendencies are best expressed in three men: Ugo Foscolo (1778–1827), Alessandro Manzoni (1785–1873), and Giacomo Leopardi (1798–1837). Foscolo was a man of the backward outlook upon the grandeur of ancient Italy, surrounded with the hazy splendor of Grecian islands. He came from Zante, the ancient Zachinthos, and the hopes of the present were for him realized in the Venetian Republic, considered not as a finality, but as a promise of a great Italian future. He hailed in a strong ode the Napoleon that spoke at Rimini, and he lashed the tyrant that betrayed at Campo Formio. Turning to violence for a moment, he was swept by defeat into an exile full of bitter reflection and despair. It is true that the earlier redaction of the *Letters of Jacopo Ortis* is preëminently sentimental, going not much beyond the horizon of Goethe's *Werther*, by which it was inspired. But in the second form of this romance the patriotic motive is much more powerful: it is a deluded national consciousness, as well as an unhappy love, that leads to suicide. As a matter of fact Foscolo found solace for his disappointment in the elegance of classic art, expressing itself in his tragedies and in his masterpiece, the *Sepolcri*. Here there is a mood made up not only of classicism, but of a spirit steeped in English romanticism (particularly Ossian). In the hymn to the *Graces* classic æstheticism holds uncontested sway.

The refuge that Foscolo found in art, as a national heritage, Manzoni found in religion, as an institution no less national. For surely the intense religious devotion that characterizes especially the Milanese school of the early ottocento satisfied not only a craving for security of spirit, but a patriotic pride in the Church as well. This feeling, in fact, was strong enough to form a political party and create a slogan under Pius IX. It meant everything to Manzoni. In the *Cinque maggio* the conqueror of Europe, dying at St. Helena, finds peace from the turmoil of life in the arms of faith. In the ode on *Pentecost*—this is the real gem of the *Inni sacri*, which, though surely competent, attain elsewhere no exceptional heights of inspiration—he again returns to the portrayal of the confidence in life, the impregnability of hope, that comes over the soul entirely submissive to the consciousness of God's presence within. And thus made sure of himself, Manzoni goes on to grapple with immediate practical problems: he was too big a man to be restricted within one mood and too vigorous to exhaust himself with Foscolo in a contemplative inaction. He attacks the philosophical problems presented by the new age in science and in the new outlook on ethics. The national culture attracts him as an æsthetician and critic. So he throws himself particularly into the question of the national language, and the Manzonian theory is triumphant to-day. His doctrine reconciles the prevalent Tuscaninity of the Italian language with the cultural tradition as a whole; for he favors a liberal standard of speech, recognizing additions from dialectical or literary sources, but, where questions of alternative are involved, choosing the usage of the spoken language of Florence. The principal instrument in this propaganda has been his famous romance *I promessi sposi* (The Betrothed). This novel rests on a remarkable historical study of the seventeenth century, particularly of the conditions surrounding the plague of 1630. It aimed to express also the idealism of the Italian romantics. In some of its aspects Italian romanticism is only a reflection of the ideas of the romantics in France and Germany—thus so far as the attitude towards preceptual classic forms and limitations of subject are concerned. In other respects it is distinctively Italian, Italian in that it identified itself with the political unification of Italy and with Catholic ideals. It crystallized as a school in the group that published the journal *Conciliatore* at Milan. Its manifesto was written by Giovanni Berchet (1783–1851), who, in the famous *Letter of Grisostomo*, announced its æsthetic principles and who illustrated its methods in his ballads. Here let us stress the *Hermit of Mont Cenis* as the most enduring, though it was Berchet's patriotic poems that endeared him to his own and the following generation. Manzoni's tragedies, too, violated consciously the classic unities; but their revolt is superficial, for his mind was here dominated by the classic dignity of Alfieri, which permeated the tragedy down through S. Battista Nicolini (1788–1855) and Pietro Cossa (1830–81) and is not wholly inefficacious to-day. *I promessi sposi* is, however, the great masterpiece of this movement: intrinsically, because of its graphic description of the plague, the portrait of the vicious and repentant noble called the Innominato, for the unswerving monk Fra Cristoforo, the human, vacillating Don Abondio; historically, for its numerous epigones, the romances of Massimo d'Azeglio (1798–1866, *Ettore Fieramosca*, *Nicolò de' Lapi*), of Francesco Domenico Guerrazzi (1804–73, *L'Assedio di Firenze*, *Battaglia di Benevento*, *Beatrice Cenci*), Cesare Cantù (*Margherita Pusterla*). Everybody wrote historical romances, inspiring hatred of oppression, love of Italy, and, more often than not, religious resignation, as indeed everybody wrote his *Memoirs*. This is particularly true after 1850, when liberty was no longer a dream; but though composed in later periods, they reflect the temper of the first half of the century. Here the best specimen—worth more than an army corps for the cause of freedom—was *Le mie prigioni* of Silvio Pellico (1789–1854), an Alfierian in his tragedy *Francesca da Rimini*, who here narrates the horrors of an Austrian prison system with a sobriety that compels conviction and a religious humility that explains much. It is a good-natured and thoroughly moral bourgeois that D'Azeglio described in himself in *I miei ricordi*. Historical and philosophical writings did not go much beyond the limits that Manzoni embraces in his own personality: dominated by the method of the eighteenth century, it set as its main problem the vindication of Catholic idealism against the eighteenth-century philosophic rationalism, attempting at the same time to free Catholicism itself from Jesuitical control and ideas. Thus the historian Carlo Botta (1766–1837), thus the critic Pietro Giordani (1774–1848), thus the philosopher Rosmini, and, in a higher order still, Vincenzo Gioberti (1801–52), whose writings, collected under the title *Nuova protologia*, exhaust the middle-class mind of the early nineteenth century.

Leopardi's delusion was a delusion not to be anæstheticized in the art of Foscolo nor cajoled by the religion of Manzoni. He considered it rather the vindication of his dignity as a human being to look his delusion in the face and, finding his life problem—whether as an Italian or as a man—unanswerable, to live and die with consciousness alive in the fullest possible measure to his delusion. This is the anguished nobility that cries in the ode to the *Ginestra*. And with the same melancholy, even desperate, determination he looks in his idylls and *canzoni* upon love, upon patriotism, upon the life around him. The triumphant middle class of the last decades, that has passed out of oppression to material prosperity, and in that prosperity has found the justification of its ethical ideals and metaphysical formulas, finds Leopardi a problem. Whence this morbidity of temperament, this insanity that all is genius? And the answer has been found in his diseased and distorted body, his unfortunate experiences in love and life, even in the sentimentality of his grandfather. But is there not, at least, the chance that some other criticism may come to take Leopardi at his own evaluation and see in his work the expression of a serene intellect, that before the problem of human destiny will accept no compromises, content, like the Vergil of Dante's *Purgatory*, in the presence of the enigma to bow its head?

There was in Leopardi as much of plastic vision and æsthetic sincerity as in Foscolo; and in Leopardi's philosophy there was even more inaction. The freedom of Italy was won not so much by such men as by men like Giuseppe Giusti (1809–50), whose smashing satire—read the galloping verses of the *Stivale* (The Boot), the *Steam Guillotine*—filled the Italian youth with the eagerness to leave philosophic meditation to their grandfathers and go out and make Italy. This had been done virtually by 1860, though, to cite a famous epigram, when Italy had been made, there still remained the problem of making Italy. With this latter task, in its intellectual bearings, contemporary Italian literature is still engaged. Production has been enormous in bulk and high in quality, though we are still, perhaps, too near it to keep all its aspects in true proportion. Two figures at least stand out with permanent distinctness: Giosuè Carducci (1836–1907) and Gabriele d'Annunzio (1864–). Carducci, above all, represents the attainment by the Italian middle class to its own self-consciousness. He has the Leopardian strain and the Manzonian strain, and his Hellenism—is it not already foreshadowed in definite outline in Foscolo? His mind is obsessed by Italy's past, which for him reaches back to Hellenic origins, of whose culture ancient Rome was the legatee and of which modern Italy will be the transmitter to the civilization of the future. Or rather, Carducci's atavism is not exactly an obsession, so completely is it dominated by his spirit, assimilated by his intellect, and directed towards action by his will. The revival of ancient glory presented itself at first to Carducci polemically as a reaction against romanticism; polemically also, later, as a question of form: in the *Odi barbare* he leaves rhyme and traditional metrical forms for old Greek and Latin measure. But the notion of propaganda is soon swallowed by his artistic vision itself. The ode to *Aurora* drips with light in which Carducci revels for its own glory. With this splendor he clothes all the past of Italy and Greece. In its behalf he fights the ascetic gloom of Christianity. The *Hymn to Satan* (Satan is progress; Jehovah, the Church, is reaction, darkness) is lacking, perhaps, in depth. But the odes *To the Springs of the Clitumnus, In a Gothic Church* are immortal poems to faith in national destiny and faith in the joy of life, as opposed by "impious" religious terror. In the *Church of Polenta* he sings the palinode, recognizing the unifying force of the Church in Italian consciousness. The ode *At the Station*, the sonnet *The Ox*, the poems *Before San Guido, Niccola Pisano*—their number could be much increased—are each masterpieces for objectivity and aspiration.

D'Annunzio's Hellenism is even more intense, as indeed it rests on a vaster Hellenic culture, though less pedantic, than Carducci's. In his indefatigable production, as varied as his life has been troubled, one trait seems always to appear: it has well been called a sensualistic dilettantism. D'Annunzio has often gone out to ideas from abroad: Tolstoy left a trace on the *L'Innocente*, Nietzsche on the *Triumph of Death*. He has felt German philosophy as well as English, French, and Greek poetry. For it is his task in life to *feel* everything. He revels in sensation of every sort, in color, in sound, in smell, in touch, and he is fascinated by, just as he thoroughly understands, the minutest emotional reactions to sensation. *Il piacere* (Desire), for all its ugly theme, is in this respect one of the most solidly packed romances since Thackeray in England and Flaubert in France, just as *Fuoco* (Fire) is one of the most remarkable for lyric splendor. Fortuitous circumstances largely have stressed the importance of his dramas (*La gioconda, La città morta, La gloria, Francesca da Rimini*, etc.), that almost never go beyond the scope of his earlier poetry and romances, which remain most truly representative of his surprising genius.

In sharp contrast with D'Annunzio's pagan sensualism stands the Catholic idealism of Antonio Fogazzaro (1842–1909), who shows will triumphant over passion in the beautiful romance *Daniele Cortis*, but who more comprehensively in a trilogy of novels—*Piccolo mondo antico, Piccolo mondo moderno, Il santo*—tries to deal with the paramount questions of modern Italian life. There he sustains nationalism, patriotism, as the fundamental necessity, but also a progressive nationalism broadening out the prospects of the individual life, integrating everything in faith and Christian ethics, stripped of formalism and lived in action.

Around these men we may group a host of less distinct personalities and systems, the poets Giovanni Prati (1815–84) and Aleardo Aleardi (1812–78) of the older group, classic in manner, romantic in substance; Mario Rapisardi (1844–1911), Arturo Graf (1848–1913), Ada Negri (1870–); among the more recent. Giovanni Pascoli (1851–1913) has attained greater distinction, perhaps, for his brilliant classicism; Lorenzo Stecchetti (1845–) for his method called realism or verism. Domenico Gnoli has recently shifted the classic elegance of his earlier poetry to a manner of exquisite romantic tenderness. In the novel, from Ippolito Nievo (1832–61), who may be said to have begun the serious psychological study of contemporary problems, through Edmondo de Amicis (1848–1908), who struck the ethical keynote for the younger generation, through Enrico Castelnuovo (1839–), with his subtle humor, through the Barrilis, the Farinas, the Rovettas, the Seraos, we come down to the contemporary field, where we may say the short story of regional life shares with the drama the place of chief interest in contemporary literature. Regional life has in Italy always found a free-flowing channel of expression in dialect literature: one thinks, e.g., of Meli for Sicily, of Porta for Milan, of Ruzzante, Calmo, Maffio Venier for Venice, of Burchiello for Florence—all these from the older literature. The sonnets of Giuseppe Gioachino Belli in the Roman dialect of the epoch around 1850 set the method for the flourishing contemporary schools. Its dean is Renato Fucini, who, in his tales *Le veglie di Neri* and *All' aria aperta* and in his Pisan sonnets, has portrayed the life of the Tuscan Campagna with consummate art. Trilussa and Pascarella have been, again in Roman dialect, doing the same for Rome. One may say that the Neapolitan plays and poems of Salvatore di Giacomo are among the most beautiful productions of recent Italian literature. But the output has been both rich and solid in the tale in Italian: Grazia Deledda for Sardinia, Giovanni Verga for Sicily, Antonio Beltramelli for Umbria. Luigi Pastonchi and Ugo Ojetti are doing splendid work of the same sort, largely as journalists. The Italian comedy long felt the influence of Goldoni. It left its imitative manner for a time in Paolo Ferrari (1822–89) and in Vittorio Bersezio, who reflects the life of Piedmont. It came to great excellence in Giuseppe Giacosa (1847–1904), whose *Come le foglie* (Like Falling Leaves) has enjoyed a permanent vogue. Giacosa most deeply felt the problems occasioned by the spirit of commercialism in its fight with the sounder middle-class virtues. For these in a sense he fought, while it is again the cause of faith and Christian morality that inspires the deeply serious drama of E. A. Butti (1875–1910). Butti has written comedies and romances of a high order on contemporary aristocratic life, but perhaps his most charming and intense play is *Fiamme nell' ombra*. The Neapolitan Roberto Bracco is, on the other hand, an observer who holds no thesis, but catches with wonderful sense of situation what he sees. *Astray in the Dark, Ghosts, The Saint, Don Pietro Caruso, Snow-Storm*—these are all gems of literature that enable Italy to compare well with other European nations on the contemporary stage. Italian criticism has in the nineteenth century felt the full force of the historical method; with Alessandro d'Ancona (1835–1914) the most venerable figure of this school has passed away. Its greatest name is Francesco de Sanctis, well qualified to stand beside Sainte-Beuve and Taine for the value, if not for the bulk, of his work. The method and ability of De Sanctis descended upon Benedetto Croce, who, through the splendid essays in his journal *La Critica*, is exerting at present perhaps the most pronounced influence upon æsthetic theory and critical method of any one in Europe. Cesare Lombroso (1836–1908) has similarly developed Italian criminology, and his broad outlook stimulated to a great degree Guglielmo Ferrero, who, after important works on jurisprudence and Roman history, has been an important international figure through his criticism of contemporary life in Europe and America.

Italian literature to-day is national still rather than cosmopolitan in character: its chief function is the consolidating of the different regional tempers into a national Italian unit; its chief materials are the memories of a great cultural history in the past, a great spiritual institution, the Church. In this work its besetting danger is atavism. The more violent elements of the bourgeoisie have sensed this danger and created *futurism*. It remains to be seen whether the new nationalism, which for some years now has been conscious of itself, can turn into new channels the deep-lying artistic sense of the people, its ready hospitality to new ideas, its belief in literature. As it stands, Italy's most influential contributions to world literature have been the *Comedy* of Dante and the Italian Renaissance.

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ITALIAN MOLIÈRE, mô'lyâr', The. A name given to the Italian dramatist Goldoni (q.v.).

ITALIAN PINDAR, The. A name given to the lyric poet Chiabrera (q.v.).

ITALIAN POLITICAL PARTIES. See Political Parties, *Italy*.

ITALIAN REPUBLIC. See Cisalpine Republic.

ITALIAN SOMALILAND. See Somaliland; Protectorate.

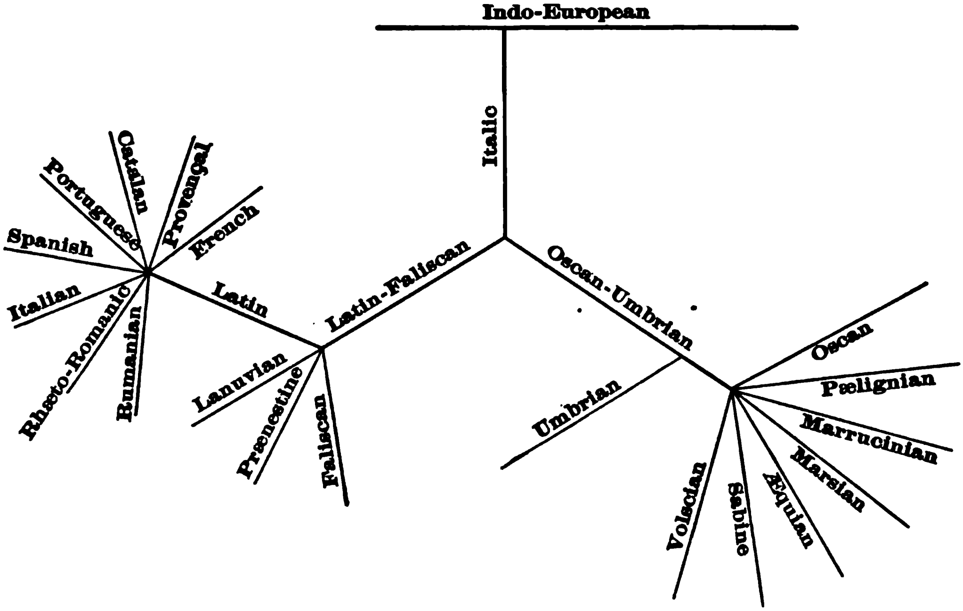
ITALIAN VERSIONS. See Bible.

ITALIC LANGUAGES. A group of closely related languages of which Latin and the modern Romance tongues are the best-known representatives. At the dawn of history the group was confined to Italy, unless, as some scholars suppose, the language of the Siculi was Italic. Many of the languages anciently spoken in the peninsula were not Italic languages; the Greek dialects which were in use at many points along the southern coast, the Messapian of Iapygia, the Gallic in the north, and the Etruscan in the centre are certainly to be excluded from the group, and so probably are the Ligurian and Venetian of the north. Next to Latin and its descendants the most important Italic language is Oscan, which in the fourth and third centuries before Christ was spoken in Samnium, including the country of the Frentani and Hirpini, northern Apulia, Lucania, Bruttium, and the Sicilian city of Messana. North and northwest of the Oscan terrain and south, east, and northeast of Rome were spoken Pælignian, Marrucinian, Vestinian, Volscian, Marsian, Æquian, Sabine, and some other less important dialects. In the immediate neighborhood of Rome were spoken Prænestine, Lanuvian, and other dialects of the Latini, while a few miles to the north of the city, surrounded by Etruscan territory, was the Italic language of Falerii (Faliscan). The northernmost member of the group was Umbrian, the language of Umbria; our knowledge of it is almost exclusively based upon documents from the town of Iguvium, and we do not know how numerous or extensive the local variations from Iguvian usage were.

The Italic languages form a branch of the Indo-European languages (otherwise called Aryan or Indo-Germanic, q.v.). They are more closely related to the Celtic languages (q.v.) than to any other known group of Indo-European. Although there is very little obvious resemblance between Latin and any one of the Celtic languages of which we have extensive documents, this is due partly to the fact that these are known only from comparatively recent times and partly to the unusually numerous changes which the Celtic languages have suffered; if we had documents as early as the earliest we have for Indian and Iranian, Italic and Celtic might appear almost identical. At any rate there is no doubt that Italic and Celtic are to be grouped together as forming the Italo-Celtic branch of Indo-European. Among the most striking of their common features are the following: (1) abstract nouns formed by the suffix *ti* with an extension in *n*, e.g., Lat. *men-ti-on-em*, OIr. *ermi-ti-u;* (2) superlatives in *is-omos*, e.g., Lat. *ægerrimus* from **ægr-isomos*, Gall. *οὐξισάμη*, 'highest'; (3) the use of the *o*-stem locative in *ei* (Lat. *ī*, Celt. *ī*) as a genitive, e.g., Lat. *agri*, OIr. (Ogam inscription) *maqi*, 'of a son'; (4) the fusion of the Indo-European aorist and perfect; (5) the formation of passives and deponents in *r*, e.g., Lat. *sequitur* = OIr. *sechithir;* (6) the formation of the preterit passive from the past passive participle in *to*, e.g., Lat. *monitus*, 'he was advised,' OIr. *ro-léiced*, 'he was left.' A remarkable fact which may or may not be significant is that the Celtic languages, like the Italic, are divided into two groups, one of which represents Indo-European $q^{u̯}$ by *p* and the other by *qu* (later *c*). The resemblances between Latin and Greek, which formerly led scholars to assume a close relationship between the Italic and Hellenic (see Greek Language) branches of Indo-European, are due chiefly to extensive borrowing within historical times, and partly also to the fact that Greek and Latin are the only languages of the western grand division (*centum* languages) of the family from which we have ancient documents.

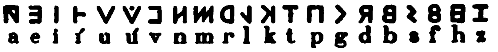
Features which distinguish the Italic languages from Celtic are the following: 1. The original diphthong *eu* became *ou*, while in the earliest-known Celtic (Gallic) the two were still distinct, e.g., OLat. *douco*, Goth. *tiuhan*, Indo-European **deuk-*. 2. The Indo-European aspirates (*bh*, *ph*, *gh*, *kh*, etc.) became spirants (*f*, *h*, etc.), whereas in Celtic they lost their aspiration and became *b*, *p*, *g*, *k*, etc., e.g., Lat. *fert*, OIr. *berid*, Skt. *bhárati*. 3. The ablatival suffix *d* was extended from the *o* stems to the other declensions, e.g., OLat. *sententiad*, Osc. *toutad*, "civitate." The case system of the known Celtic languages is so meagre that one cannot say positively that early Celtic did not share in this innovation. 4. The Indo-European interrogative pronoun came to be used as a relative; Celtic relative clauses are so different from anything else in Indo-European that one may suppose that there was no relative pronoun in the Italo-Celtic period. 5. The extensive changes of the Indo-European verb which yielded the four Latin conjugations are most of them common to all the Italic languages, but only a few of them are to be found in Celtic. 6. Italic formed a gerundive in *ndo*, e.g., Oscan úpsannam, "faciendam." 7. In the realm of syntax we may mention especially the construction of the accusative with the infinitive.

The Italic languages fall into two groups, the Oscan-Umbrian and the Latin-Faliscan. The most obvious and convenient mark of distinction between the two groups is their treatment of the Indo-European labiovelars q^{u} and g^{u}, which appear in Latin as *qu* and *v* (*gu* after nasals), but as *p* and *b* in Oscan-Umbrian. At the beginning of our records Latin-Faliscan was confined to the Roman Campagna, the Alban Hills, and the town of Falerii, while Oscan-Umbrian covered all the rest of the Italic territory. There is reason to suppose that dialects of the Latin-Faliscan type had once been spoken through a much wider region, and that they had been supplanted by the invading Etruscan and Oscan-Umbrian. The rise of Rome, then, rescued a type of speech that was apparently on the verge of extinction and spread it over half the civilized world. Oscan-Umbrian is divided into two main branches, one of which consists of Umbrian, while the other includes Oscan and the minor dialects which occupy the territory between Oscan and Umbrian. These minor dialects are sometimes grouped together under the name Sabellian, but they do not seem to have any closer affinity with each other than with Oscan. The Latin-Faliscan includes Latin, the other dialects of the Latini, of which Prænestine and Lanuvian are the best known, and the Faliscan of Falerii. From Latin are descended the modern Romance languages. The mutual relationship of the Italic languages is roughly represented by the following table:



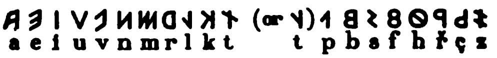
Alphabet. The Italic dialects employed several different alphabets, all of them based on the Greek alphabet of the Chalcidian colonies in Italy, especially on that of Cumæ. Two forms were derived from this source, the Latin-Faliscan and the Etruscan-Oscan-Umbrian. The Oscan and Umbrian alphabets consisted of 21 and 19 letters respectively, and were read, like the oldest Latin and Greek, from right to left. The letters were as follows:

Oscan



a e i í u ú v n m r l k t p g d b s f h z

Umbrian



a e i u v n m r l k t t p b s f h ř ç z

Oscan V̇ is a modification of V, which is used in the later inscriptions to represent the *o* sound. This sound is represented in early Oscan and in Umbrian by the unmodified V. Oscan ⊦ represents an open *e* sound. There were a few numerical signs, Oscan-Umbrian | for 1, X for

10, Oscan V for 5,) for 100. Both Oscan and Umbrian, however, frequently employed the Latin alphabet. In modern linguistic works the words in Oscan-Umbrian script are usually printed in bold-faced or spaced Roman type, those in Latin letters are represented by italics, as Oscan **faksiad** or faksiad, 'let him make,' *fefacust*, 'he will have made.' In addition the oldest Italic inscriptions are in many cases written in the Greek alphabet. Punctuation in the inscriptions is capricious and frequently neglected; the usual system, however, is one or more dots.

Oscan-Umbrian. The Oscan-Umbrian languages possess many features in common besides their treatment of the Indo-European labiovelars: *nd* became *nn*, e.g., Osc. **úpsannam**, "operandam"; *s* was retained before nasals and liquids, e.g., Osc. **fíisnam**, "fanum"; *f* from Indo-European *bh* and *dh* was retained even in the interior of a word, e.g., Umb. **tefe**, "tibi"; final *ā* was changed in the direction of *ō*, e.g., Osc. *molto*, "multa"; the nominative plural of the first and second declensions retained the original endings *ās* and *ōs;* the genitive singular of the first declension retained the original ending *ās*, and the genitive singular of the third declension was *eis*, the original ending of the *i* stems. In all of the common features of Oscan-Umbrian which we have mentioned those languages differed from Latin; in many of them, however, Oscan-Umbrian merely retained the Italic form or usage, while Latin suffered some change. In some cases of the latter sort Prænestine, Lanuvian, and Faliscan, or some of them, were like the Oscan-Umbrian group in retaining the primitive state of affairs; thus, *f* appears in the interior of the word in Faliscan *carefo*, "carebo," and Prænestine *nefrones*, "kidneys." Early Latin as well as Prænestine seems to have retained *s* before nasals, for the Duenos inscription which was found at Rome has the word *cosmis*.

Oscan. As already stated in detail, Oscan was spoken in a very large part of central and southern Italy. Although a few local dialectic peculiarities have been detected, the language is remarkably homogeneous in view of its wide extension. The system of writing is very clear and regular; it is the sort of writing that one expects for a highly cultivated language, and in some details it shows unmistakable traces of the work of the schoolmaster. Oscan was the official language of the powerful Samnite state, and it was spoken in the wealthy and highly civilized cities of Campania, where early Greek influence upon Italian civilization was strongest. We have, in short, all the conditions for the production of a literature, and we find some of the effects which a literature might exert upon the language. It is not surprising, then, to learn that the Romans got their *fabella Atellana* from the Oscans (Livy, 7, 2, 12: *quod genus ludorum ab Oscis acceptum;* cf. Cicero, *Fam.*, 7, 1, 3, and Tacitus, *Ann.*, 4, 14). Strabo tells us (5, 3, 6, p. 233) that even in his day the Oscan language was to be heard on the stage. The poet Ennius boasted that he had three souls because he spoke Latin, Greek, and Oscan (Gellius, 17, 17, 1); he did not boast of a Messapian soul, although Messapian was his native language, doubtless because there was no Messapian literature. Oscan was still in use at Pompeii when that town was destroyed in 79 A.D.

The Oscan inscriptions number about 230. Most of them, however, contain exclusively, or almost exclusively, proper names, and only four —the Bantine tablet, the Cippus of Abella, the tablet of Agnone, and the Curse of Vibia—are of any considerable length. The first of these, the Tabula Bantina, discovered in 1793, is the longest. It is a mutilated bronze plate about 15 by 10 inches and bears on one side an inscription of 38 lines in Oscan and on the other a Latin text 32 lines long. The tablet deals with legal regulations concerning the city of Bantia in Lucania. The Cippus of Abella, found near Avella in 1745, is a block of hard limestone 6 feet, 5 inches high, 1 foot, 8 inches broad, and 11 inches thick. It contains in 58 short lines of letters about 1½ inches high an agreement between the towns of Abella and Nola concerning the joint use of a temple of Hercules. The tablet of Agnone, discovered in 1848, is of bronze, with a handle and chain by which it may be hung up, and measures 11 × 6 inches. It is inscribed on both sides with 47 very short lines, which contain the names of the deities to whom statues in a certain sacred grove belonged. The Curse of Vibia, found at Capua in 1876, consists of 13 lines, written on a lead plate about 8¾ × 3 inches. As a specimen of Oscan, the following passage may be taken from the Bantine tablet, 5–7:

Oscan: *deiuatud sipus comenei perum dolom mallom, siom ioc comono mais egm(as touti)cas amnud pan pieisum brateis auti cadeis amnud, inim idic siom dat sena(teis) tanginud maimas carneis pertumum.*

Latin: iurato sciens in comitio sine dolo malo, se ea comitia magis rei publicæ causa quam cuiuspiam gratiæ aut inimicitiæ causa, idque se de senatus sententia maximæ partis perimere.

The most striking peculiarity of Oscan is the conservatism of its vowel system. If extensive remains of the language are ever discovered, it will be as important as Greek as a witness to the vocalism of Indo-European. The long diphthongs are shortened, but the original quality of all diphthongs is retained, except that *eu* becomes *ou* and *əu* and *əi* become *au* and *ai*. Intervocalic *s* remains a sibilant which in the native alphabet is not distinguished from *s* in other positions, but is written *z* in the Latin alphabet, e.g., the genitive plural ending *azum*, Umb. *aru*, Lat. *ārum*. Anaptyctic vowels are developed between liquids or nasals and mutes, e.g., **aragetud**, "argento." After a dental *u* becomes *iu;* e.g., **tiurri**, "turrim."

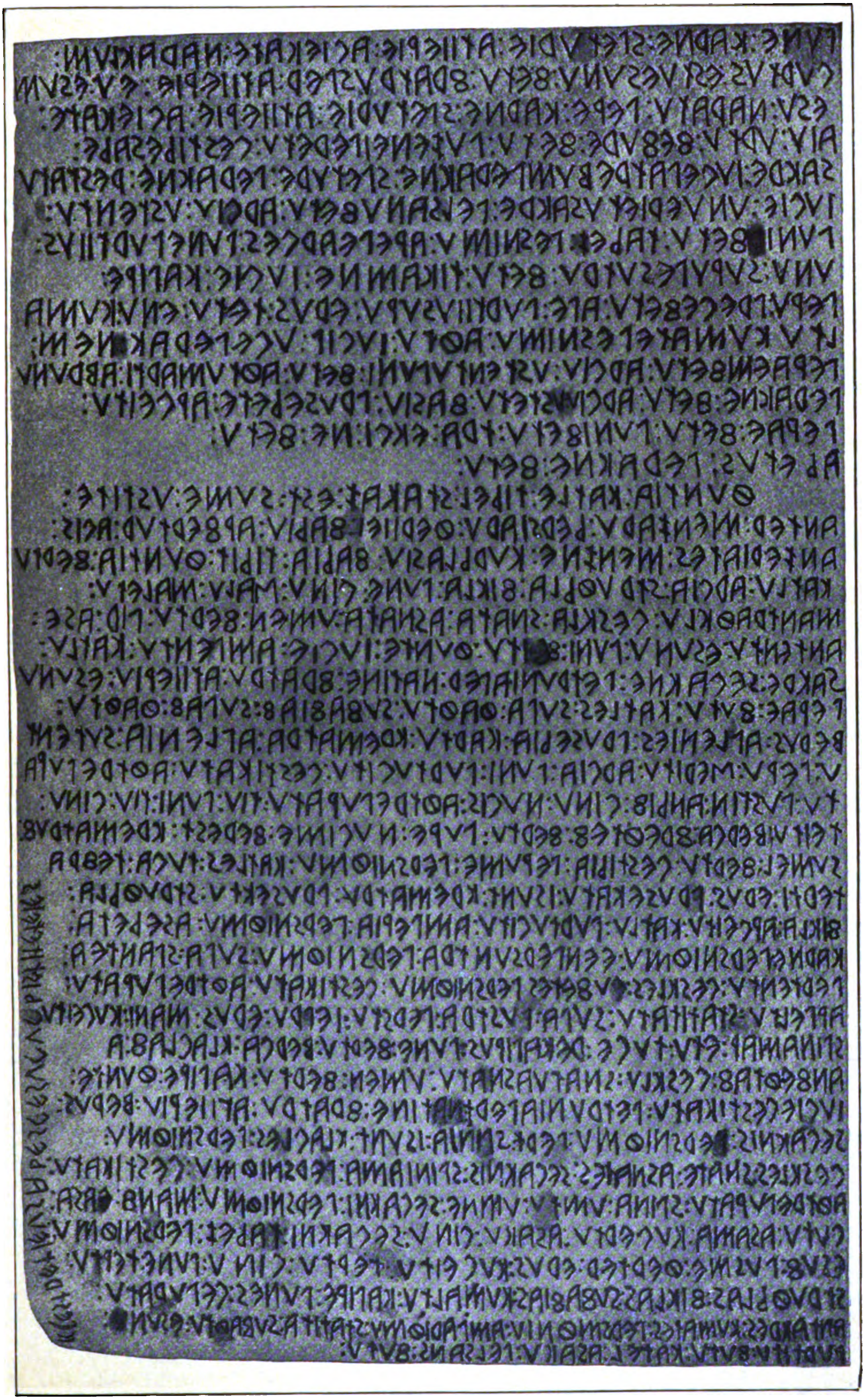
Pælignian was spoken in a small mountainous district north of Samnium. More than 30 Pælignian inscriptions are known, but the only one of any length is the Herentas inscription. It was unearthed in a grave at Pentima, the ancient Corfinium, in 1877. It is written on the side face of a block of travertine, 2 feet, 7 inches long, 2 feet, 5 inches from front to back, and about 11¼ inches high, and is the epitaph of a priestess named Vibia. As a specimen of Pælignian, we may cite from the Herentas inscription, 5–6:

Pælignian: *sua aetatu firata fertlid praicime Perseponas af ded.*

Latin: suam ætatem feneratam fertiliter in regnum Persephonæ abdidit.

Pælignian agrees with Oscan more closely than any other known dialect. It shares the retention of the intervocalic sibilant and the development of anaptyctic vowels.

Marrucinian. This dialect, spoken to the northeast of Pælignian, seems from its very scanty remains to be closely akin to the latter. It is known from two inscriptions, one from



IGUVINE TABLET, 1 a.

Teate, the centre of the Marrucinian territory, containing merely two proper names, and the other from Rapino, written in 12 short lines on a rusty bronze tablet about 6 inches square. This dates from about 250 B.C. and is concerned with certain sacrificial rites. Lines 1–5 of the bronze of Rapino may be quoted to give an idea of this dialect:

Marrucinian: *aisos pacris totai Maroucai lixs. asignas ferenter auiatas toutai Maroucai.*
Latin: dis propitiis civitati Marrucæ lex. Prosiciæ feruntur auspicatæ civitati Marrucæ.

Marsian. The remnants of the Marsian dialect, spoken around Marruvium, on Lake Fucinus, are contained in a few very brief inscriptions. The dialect shows, in its monophthongization of original diphthongs, a close resemblance to Umbrian. In other respects Marsian seems to have been very similar to Pælignian and Marrucinian.

Æquian. Of the dialects of the Æqui, who centred around Cliternia and Nerea, no inscription has been preserved which is free from suspicion. If **prufatted** (Latin *probavit*) is really an Æquian form, the dialect would seem to have shown a marked affinity to Oscan (cf. Osc. **prúfatted**).

Sabine. Of Sabine also the remains are too scanty to give any information regarding the dialect. Only one inscription, which is very brief, has been preserved. It has been shown from literary evidence that *d* sometimes became *l* in Sabine, and that such Latin words as *lacrima* (Gk. *δάκρυ*), *olor* (beside *odor*), *solium* (beside *sedeo*) are Sabine loan words. The considerable number of such words in Latin indicates that the Sabine dialect exerted a powerful influence upon Latin; but our almost complete ignorance of the tongue makes it impossible to detect Sabine elements in our Latin documents, except in the case of words with *l* from *d* and words such as *catus*, which the Romans themselves call Sabine. Another peculiarity of Sabine was the conversion of *gh* into *f* where Latin has *h*.

Volscian. The Volsci, whose capital was Velitræ, have left one inscription of four lines, known as the Tabula Veliterna, discovered in 1784 and inscribed on a bronze 1⅝ × 9⅛ inches. If we may draw conclusions from this tablet, Volscian stood the nearest of all the Sabellian dialects to Umbrian. The scantiness of our sources, however, forbids any hard and fast conclusion. As a specimen of Volscian, the third line of the tablet of Velitræ may be quoted:

Volscian: *sepis toticu couehriu sepu ferom pihom estu.*
Latin: siquis publico conventu secutus erit (?) ferre pium esto.

The resemblance to Umbrian consists in (1) the monophthongization of diphthongs, e.g., *toticu*, Umb. *totar*, Osc. *touto;* (2) the loss of final *d;* and (3) the assibilation of *k* before *e* (?) and *i*, e.g., *faɔia*, Umb. **façia**, Osc. **fakiiad**.

Umbrian. The remains of Umbrian are of far greater extent than those of any other ancient Italic language except Latin. Practically all the texts in this dialect are contained in the Iguvine tablets, discovered in 1444 at Gubbio, on the site of the ancient town of Iguvium or, as it was called in the Middle Ages, Eugubium. The Iguvine tablets were originally nine, although but seven are now preserved. The tablets are of bronze, inscribed, with the exception of the third and fourth, on both sides. They vary in size, the first two being about 22 × 15 inches, the third and fourth about 16 × 12 inches, the fifth about 18 × 14 inches, and the last two about 33 × 22 inches. The entire number of lines is 449. The first four and about two-thirds of the fifth are written in the national Umbrian alphabet, while the last third of the fifth tablet, as well as the sixth and seventh, are written in Latin characters. It seems tolerably certain, both on epigraphical and linguistic evidence, that the portion in the Roman alphabet is later than that in the epichoric script. The date of the inscriptions, however, apart from this relative one of the several parts with each other, is doubtful. Possibly one will not be far astray in dating them between the third and first centuries B.C. The difference between the Old Umbrian, which is written in the national script, and the New Umbrian, which was inscribed in Latin letters, was probably more apparent than real. Since the Umbrian alphabet lacked signs for *o*, *g*, *d*, *b*, they used instead *u*, *k*, *t*, *p*. On the other hand the Latin script could represent the sound of the Umbrian ř only by *rs*. New Umbrian showed, however, a marked deviation from Old Umbrian in the change of final *s*, retained unchanged in the earlier form of the dialect, to *r*, as OUmb. **tutas**, 'of the city,' but NUmb. *totar*. There are a few other distinctions which are of minor importance, such as the more closed pronunciation of *ē* in New than in Old Umbrian (as NUmb. *habitu*, 'let him have,' but OUmb. **habetu**; NUmb. *verir*, *vereir*, 'at the gates,' but OUmb. **veres**). The Iguvine tablets are ritualistic in subject. The texts I a (which is reproduced on the accompanying plate) to I b, and VI a to VI b 47 deal with the purification of a high place near Iguvium, while the remainder of I, VI, and all of VII a treat of the purification of the city itself. The last two tablets, however, are much more detailed than the Old Umbrian. The second tablet is concerned with a lustral sacrifice for the priestly college of the Atiedii, with an optional sacrifice to an infernal deity, and with the rites to be performed at the semiannual gathering of decuries from 10 towns or clans. The third and fourth tablets give in detail the rites for sacrifice to Jupiter, Pomonus, Vesuna, and certain other deities, while the fifth is devoted to resolutions of and enactments concerning the same college of Atiedii, who figure so prominently in these inscriptions. To show the difference between Old and New Umbrian, the following passage, taken from I a 11–13 and VI b 1–2 may be cited:

Old Umbrian: **preveres Tesenakes tre buf fetu Marte Krapuvi fetu ukripe Fisiu, tutaper Ikuvina. arviu ustentu vatuva ferine fetu, puni fetu, kutef pesnimu.**
New Umbrian: *pre verir Tesenocir buf trif fetu Marte Grabouei ocriper Fisiu, totaper Iiouina. aruio fetu, uatuo ferine fetu, poni fetu, tases persnimu.*
Latin: pro portis Tessinacis tres boves facito Marti Grabovio pro arce Fisia, pro civitate Iguvina. frumenta facito, exta in ferculo facito, posca facito, tacitus precator.

Umbrian, like Latin, is characterized by a large number of phonetic changes; some of these are found also in one or another of the related languages, while others are peculiar to Umbrian alone. We have already noticed the parallelism between Umbrian and Volscian in the simplification of diphthongs, the loss of final *d*, and the assibilation of *k* before *e* and *i*. Faliscan and Prænestine agree in part with Umbrian in the simplification of the diphthongs, while Latin follows a different method of simplification, and most of the other dialects retain the diphthongs unchanged. Umbrian is like Latin in converting *s* between vowels to *r;* e.g., genitive plural *aru*, Lat. *arum*, Osc. *azum*. Intervocalic *d* became a sound which was written *rs* (ř in the Umbrian alphabet), e.g., *persi*, peři, Lat. *pede* (cf. the Sabine change of *d* to *l*). Initial *l* became *v*, e.g., vutu, Lat. *lavito*. Several other changes were scarcely less important than these.

Latin-Faliscan is distinguished from Oscan-Umbrian in (1) the treatment of the Indo-European labiovelars, e.g., Lat. *quando*, Falisc. *cuando*, Osc. pún, "cum"; (2) the retention of final *a*, e.g., Lat. *multa*, Falisc. *Pola*, "Paulla," Osc. *molto;* (3) the formation of the genitive singular of the third declension, which in Latin shows *is* (from *es*) or *us* (from *os*), in Faliscan *o* (from *os*), but in Oscan *eis*, e.g., Lat. *nominis*, *Cæsarus*, Falisc. *Arunto*, "Arruntis," Osc. *aeteis*, "partis"; and (4) the formation of futures in *f*, which in Latin becomes *b*, e.g., Falisc. *carefo*, Lat. *carebo*. If the remains of Faliscan and the dialects of Latium were more extensive, it would no doubt be possible to point out other features common to all Latin-Faliscan dialects but not possessed by Oscan-Umbrian. In the main, however, the divergence of Latin from Oscan is due to relatively late changes in Latin itself, and the somewhat wider gap between Latin and Umbrian is due to still later changes in both Umbrian and Latin.

Latin is usually said to be the language of Latium, and that is no doubt the original meaning of the word. The Latin of the Roman Empire, however, the language in which the Latin literature is composed, was originally the language merely of the city of Rome. The rest of Latium was occupied by a considerable number of other dialects, some of which probably differed from Latin almost as widely as did Faliscan. In fact Prænestine seems to have resembled Faliscan rather more closely than it did the language of Rome. It seems best, therefore, to restrict the name Latin to the language of the city of Rome and the later language of the Roman Empire, and to regard the other ancient dialects of Latium as coördinate with it.

Faliscan was the language of the ancient town of Falerii, situated about 30 miles north of Rome and about 2 miles west of the Tiber. Although the town belonged to the Etruscan confederacy from the beginning of our records, its language and some of its customs were Italic. The 37 inscriptions are very brief and consist for the most part of proper names, excepting the younger Faliscan texts, which, although longer, contain so large an element of Latin that they are of no linguistic importance. The following inscription on the patera found near Cività Castellana, the ancient Falerii, in 1887 is a good example of this dialect:

Faliscan: *foied uino pipafo cra carefo.*
Latin: hodie vinum bibam cras carebo.

Faliscan was differentiated from Latin by the following features: (1) the retention of medial *f*, which Latin and some of the dialects of Latium changed to *b*, e.g., *carefo*, Lat. *carebo;* (2) the representation of initial Indo-European *gh* by *f*, where Latin and also Oscan-Umbrian had *h*, e.g., *foied*, Lat. *hodie;* (3) the change of initial *f*, from Indo-European *bh* or *dh*, to *h*, e.g., *haba*, Lat. *faba;* (4) the retention of intervocalic *s* as a sibilant, written sometimes *s* and sometimes *z*, e.g., *Folcozeo*, *Folcosio*, *Halæsus*, *de zenatuo sententiad*. (5) To some extent at least Faliscan corresponded with Umbrian rather than with Latin in the simplification of the diphthongs; *loferta*, "liberta," shows *o* for Italic *ou* (Pælignian *loufir*), whereas Latin changed *ou* to *ū*.

Prænestine. The dialect of Præneste is known from a number of early inscriptions. These texts consist for the most part of lists of names of deities inscribed on brass mirrors and cylindrical caskets found in Prænestine tombs. The most interesting relic of the dialect is the famous Prænestine fibula, a gold brooch of about the sixth century B.C., which gives, therefore, one of the earliest of all Italic inscriptions. It is as follows:

Prænestine: *Manios med fhefhaked Numasioi.*
Latin: Manius me fecit Numerio.

We do not know that this inscription contains any feature which did not belong to Latin of the same date. In other Prænestine documents, however, we find medial *f* for Latin *b* and initial *f* for Latin *h*, as in Faliscan (e.g., *nefrones*, *Foratia*, "Horatia"). Prænestine, like Faliscan, shows the Umbrian method of simplifying the diphthongs, e.g., *losna* for *lūna* (from **louksnā*), *Hercole* for *Herculī* (from **-ei*). Like Faliscan again is the extensive Etruscan influence to be seen in the confusion of the voiced and voiceless mutes in *Alixentros* for *Alexander*, *Casentera* for *Cassandra*, etc.

Other Dialects of Latium. We know even less about the other dialects of Latium than we do about that of Præneste. Lanuvian *nebrundines* beside Prænestine *nefrones* shows that the Latin change of medial *f* to *b* was not entirely confined to the city of Rome. The grammarians cite "rustic" forms such as *prētor* for *prætor*, *spēca* for *spica* from **speica*, *ōrum* for *aurum*. A fair inference is that the Umbrian method of simplifying the diphthongs was rather widespread in Latium.

Latin is treated under LATIN LANGUAGE; see also GRIMM'S LAW; VERNER'S LAW; INDO-GERMANIC LANGUAGES. It is necessary here only to point out the extensive influence which the other Italic languages have had upon the dialect of the city. In case a Latin word displays a feature that is known to be foreign to Latin and native to one or several of the related idioms, we may safely conclude that the word in question has been borrowed. Thus the name *Pompeius* is related to Oscan **pompe* instead of to the equivalent Latin *quinque*, which yielded the genuine Roman names *Quin(c)tius*, *Quin(c)tilius*, etc. *Albius* is the Latin form of the dialectic *Alfius*. *Rūfus* must come from a dialect which retained medial *f* but changed *ou* to *ū* as Latin did; the synonym *rōbus*, on the other hand, implies a dialect which changed medial *f* to *b* but which changed *ou* to *ō* in the Umbrian fashion. Very likely both words came from dialects of Latium. Plautus's *monerula* for *monedula*, and *dispennite* and *distennite* for *dispendite* and *distendite*, display Umbrian sound changes.

The modern Italian dialects preserve some traces of the ancient Italic languages. Neapolitan *attrufe* comes from Oscan **octufer*, not from Latin *October*. The modern Italian assimilation of *nd* to *nn* covers about the territory once occupied by the Oscan-Umbrian languages.

Bibliography. The most convenient and reliable work on Oscan and Umbrian is C. D. Buck, *Grammar of Oscan and Umbrian* (Boston, 1904). The fullest grammatical discussion of Oscan-Umbrian, including the minor dialects, but not

Faliscan or the dialects of Latium, is Von Planta, *Grammatik der oskisch-umbrischen Dialekte* (Strassburg, 1892–97). The fullest collection of material, with brief discussion and including Faliscan, is R. S. Conway, *The Italic Dialects* (2 vols., Cambridge, 1897). A full but uncritical treatment of Faliscan is Deeke, *Die Falisker* (Strassburg, 1888). The influence of the other Italic languages upon Latin is discussed in Ernout, *Les Éléments Dialectaux du Vocabulaire Latin* (Paris, 1909).

ITALIENS, ē'tȧ'lyăN', BOULEVARD DES. The most frequented and fashionable of the boulevards of Paris, named from the old Théâtre des Italiens.

ITALIENS, LES. See THÉÂTRE DES ITALIENS.

ITALY. The central of the three great peninsulas of south Europe. It stretches out in a southeast direction and is bounded on the north by Switzerland and Austria-Hungary; on the east by Austria-Hungary, the Adriatic, and the Ionian Sea; and on the southwest and west by the Mediterranean and France. It is separated from the Balkan Peninsula by the Strait of Otranto, 47 miles in width, and is nearly walled off from the great body of the continent by the lofty ranges of the Alps. With its continuation, the island of Sicily, it nearly reaches across the Mediterranean and is thus exceptionally favored with convenient commercial routes in all directions. Its position also especially adapts Italy for a large sea trade, because it is in the line of the shortest route from west and central Europe to Oriental countries. Although Italy is separated from the northern lands by the Alps, they are no longer a barrier to Italy's commerce, for several lines of railroad cross the mountains. Extending from northwest to southeast about 700 miles, and with an average breadth, except in the extreme north, of 100 miles, the mainland has an area of 91,161 square miles; to this Sicily, Sardinia, Elba, and smaller islands add 19,389 square miles, making the total area of the kingdom 110,550 square miles. The mainland is about twice as large as Pennsylvania or New York and extends from lat. 38° N. to lat. 46° 40′ N. and from long. 6° 30′ E. to long. 18° 30′ E.

Topography. The coast, 4160 miles in length (inclusive of the islands), is easily accessible from every part of the country. No settlement is remote from salt water, four-fifths of Italy being within 62 miles of the sea. In the north of the Adriatic the coast is low and sandy, bordered by shallow waters, and, except at Venice, not easily accessible to large shipping. Farther south, near Rimini, spurs from the Apennines reach the shore, which becomes high and rocky. The south and west coasts are generally high, rocky, and picturesque, with many bold promontories. The middle of the west coast, however, has three stretches of low and marshy land, known as the Maremma, the Campagna, and the Pontine Marshes. The west coast is varied by bays, gulfs, and other openings, and is therefore most favorable for commerce. In the northwest is the Gulf of Genoa, on which the wealthy city of Genoa stands. About the middle is the deep embayment with the fortress port of Gaeta. Next is the Bay of Naples, celebrated for its beauty. Beyond this is the Gulf of Salerno, at the head of which stands the port of Salerno. The southeast end of the peninsula is deeply indented by the Gulf of Taranto, which cuts off the so-called heel of Italy (ancient Calabria) from the toe (modern Calabria). The population is dense on all coasts where fever does not prevail, about 17 per cent of the inhabitants of Italy living within 3 miles of the sea.

The Kingdom of Italy falls geographically into three parts, differing from each other in surface features and climate and, as a consequence, in productions. One part to the north is continental, another to the south is peninsular, and the third is insular. The north portion contains the great plain of Lombardy, the valley of the Po, bordered on the west and north by the Alps. The Italian Alps are usually named after the provinces of the neighboring plains, as Piedmont, Lombardy, and Venetia. The peninsula is almost completely filled by the Apennines, which stretch through central and south Italy and are continued through Sicily.

The Alps, beginning at the Gulf of Genoa, extend first to the west, then to the north, and finally to the east, towering in lofty summits covered with snow fields. Their slopes are deeply scored by valleys, and they present a very abrupt face towards the plain of the Po. The rainfall on them is, as a result, rapidly transferred to the plain, making protective works along the river banks necessary in order to restrain the periodical floods.

The northern Apennines, which touch the Ligurian Alps, curve round the Gulf of Genoa and extend to the source of the Tiber. Their highest summit is Monte Cimone, 7110 feet. The central Apennines, beginning at the source of the Tiber, soon divide into several chains, forming the rugged mountain district of the Abruzzi, on the eastern verge of which is the Gran Sasso (9580 feet), the highest peak of the Apennines. The southern Apennines stretch to the southeast from the Abruzzi to the coast of the Gulf of Taranto, where they assume a southerly direction, with summits culminating in Monte Polino 7450 feet. The rugged and unfertile Apennines form the watershed of the peninsula; they are bordered, especially on the west side, by lower and more productive mountain districts that are grouped under the name of the sub-Apennine region. A number of passes through the Apennines are utilized by the highways across the peninsula. The Italian peninsula contains the only active volcano on the continent of Europe, Vesuvius.

The mountain regions of Italy, with their ruins, cloisters, storied castles, towered cities, the quietude of their rural scenes, and their picturesque aspects, are among the great charms that draw tourists to the country. Italy's beauty is enhanced by the singular clearness of the air, which causes the lines of tower and church and castle to stand out with clear-cut perfection and makes mountains that are miles away appear to be almost within touch.

The Italian islands are also mountainous. Sicily, nearly filled with the continuation of the Apennines, has the loftiest volcano in Europe (Mount Etna, 10,740 feet). It has not, however, figured so prominently in the history of volcanoes as Vesuvius, near Naples. The mountains of fertile but unhealthful and neglected Sardinia rise only a little over 5000 feet in height. The Lipari Islands are wholly volcanic in character.

Only about one-third of the surface of Italy is made up of plains, most of it being the great plain of Lombardy, or the plain of the Po.

This plain is encircled by a steep mountain wall in the form of an arch. The largest and richest farming area and the greatest industrial development belong to this low, almost flat plain. It is watered by the rivers of the Po system, which are fed by many Alpine and Apennine streams, with which the cereal and other crops are irrigated. The plain is a long narrow trough formed by subsidence between the Alps and Apennines and built up by the alluvial deposits of streams from the Alps and Apennines. It is steadily encroaching on the sea, because the Po for centuries has been extending its delta into the Adriatic. During six centuries the Po delta has increased 198 square miles in area. Recent surveys show that the increase is actively maintained at the present day. According to the calculations of Professor Marinelli, it will take over 100 centuries at the present rate of increase for the Po to fill up the whole of the north Adriatic north of lat. 40° 45′ N. The former port of Adria, which gave its name to the Adriatic, now stands about 15 miles inland. The Lombard plain has a more dense population and far more active manufacturing and business interests than the peninsula. Among the small plains of the peninsula are those of Tuscany and Apulia, the fertile plain to the north of Naples (the Campania of the ancients), that bordering on the Gulf of Manfredonia, and the Roman Campagna.

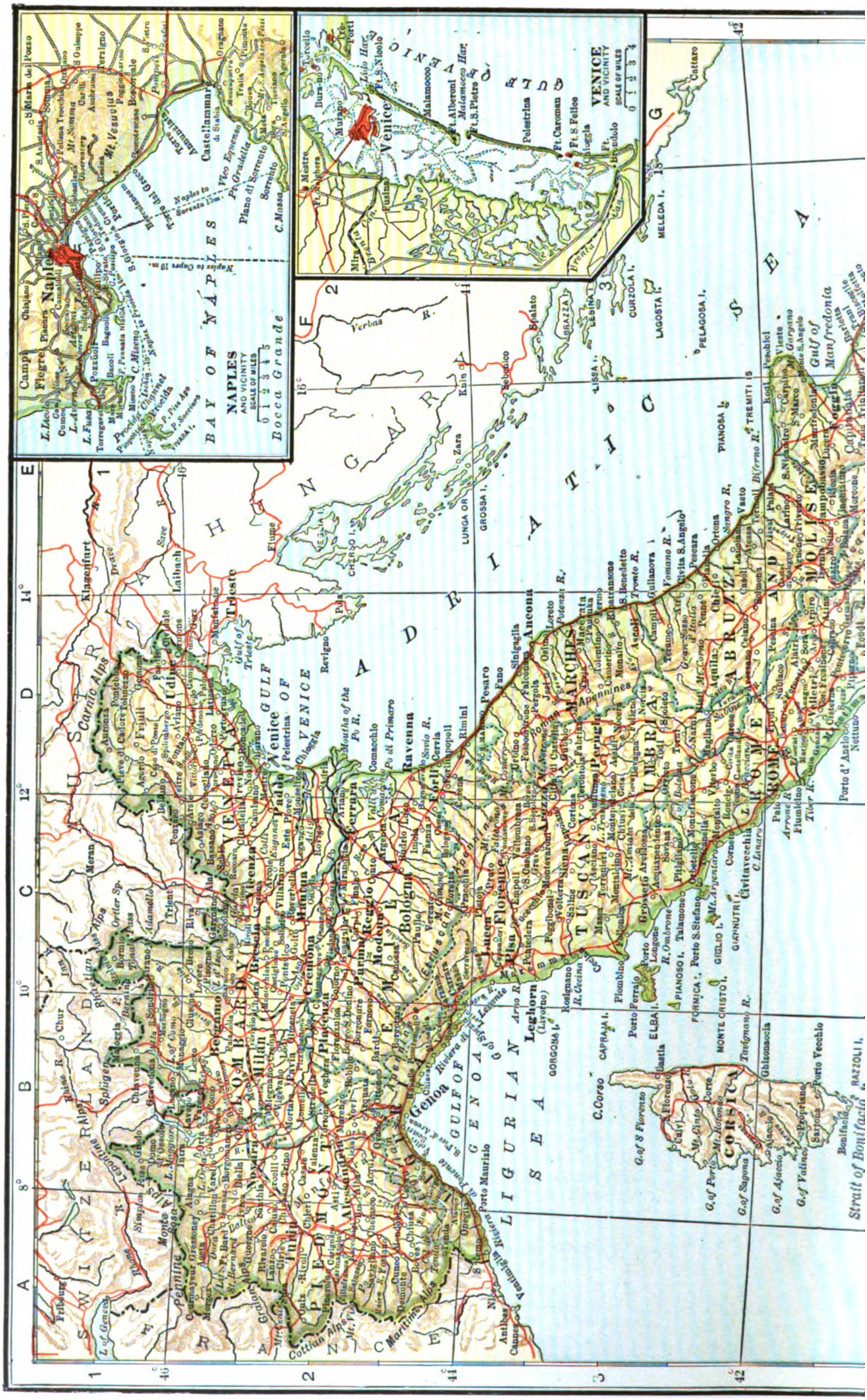
Hydrography. Italy has many streams, although it has only one great river, the Po. The most important streams, the Po and the Adige, flow into the Adriatic Sea. The Po is fed on one side by the snows of the Alps, on the other by the heavy rains of the Apennines, and drains an area of about 30,000 square miles, of which nearly 11,000 are level and, indeed, almost flat. Its course marks the line at which the sediment and débris from the Alps meet the sediment and débris from the Apennines. The Po is navigable to Turin and with its tributaries affords about 600 miles of navigation. The Adige enters Italy from Tirol and flows eastward to the Adriatic. The beds of both these rivers are constantly but very slowly being elevated by the alluvial deposits brought down from the mountains. The rivers of the peninsula are of little importance for navigation or industry. The beds of most of them are dry in summer, so that they cannot be relied upon for water power. The most important among them are the Arno, which rises in the Apennines and flows west past Florence and Pisa through a lovely and well-cultivated valley. It has a short course of only 150 miles. The Tiber rises not far from the sources of the Arno, the two rivers being connected by a canal through the tributary called the Chiana, whose waters flow partly into the Arno and partly into the Tiber. The canal system is thoroughly developed in the basin of the Po and is utilized not only for transportation, but also for the irrigation of hay and rice, so that the farmer in the great plain is almost independent of rain. There are many lakes where the mountains merge into the great plain; also a considerable number in the peninsula, some of which are crater lakes. The chief lakes of north Italy are, in the order of their size, Garda, Maggiore, and Como. These are not only important as pleasure resorts, but they form the great reservoirs for the rivers of the plain. Lago di Garda covers an area of 140 square miles and is very deep. Lago Maggiore is longer than Como, but not so large as Garda; a part of this lake is in Switzerland. Lago di Como is one of the loveliest lakes in the world. Other considerable lakes are Lugano and Iseo.

Climate. Italy may be divided into four climatic regions—northern, eastern, western, and southern. The first, coinciding with the valley of the Po, has a warm summer and a large daily range of temperature. The greatest extremes of temperature are in the Po basin; but even here, except in Piedmont, the mean winter temperature does not descend below 35° F. The great wall of the Alps protects it from the north winds and continental influences. Peninsular Italy is divided climatically into the eastern and western regions. The extremes of temperature diminish towards the south; on the east slope of the Apennines the mean annual temperature is about 57° F., while the west slope is a trifle warmer. South Italy, Sicily, and Sardinia form the last climatic division, with a mean annual temperature varying from 61° F. to 64° F., the difference between summer and winter being only 25°. The mean summer temperature at any station in the whole kingdom does not exceed 80° F., and, except in the elevated valleys of Piedmont, it is nowhere lower than 70°. As in all the Mediterranean countries, the largest rainfall occurs in the fall and winter months, after the growing season, when the westerlies prevail, so that irrigation is required in nearly all parts of the kingdom. The soils are excellent, particularly in the Lombard plain, which is among the richest agricultural lands in the world. Many once fertile parts of the Apennines, however, have been denuded of their soil.

The greatest climatic drawback of Italy is found in the swampy lands of the lower Po, the Maremma, the Campagna, the Pontine Marshes, and some other regions where intermittent malarial fevers prevail during the summer months. Only six of the provinces, including Genoa and Florence, are wholly free from malaria. Large sums of money have been spent in attempts to overcome this evil by means of drainage canals and pumping machines and by draining the breeding places of the mosquito. The extensive planting of the eucalyptus is believed also to have had a favorable effect upon the salubrity of these malarial regions.

Flora. The flora of the central and southern lowlands is typical of the Mediterranean countries, with the olive as the most characteristic tree. The great extent of the mountains and highlands, however, causes the mrytle, olive, and other evergreens to be confined to the coasts, especially in north Italy, where the olive is excluded from the plain by the colder winter weather. In the northern plain are maize, wheat, vines, and mulberries. Rice is grown on the irrigated fields near the Po. The flora of the Apennines is very much like that of central Europe. The shores of the Tyrrhenian Sea present almost a continuous growth of orange, olive, and lemon trees. In the extreme south the vegetation is subtropical; the sugar cane, the Indian fig, and the date palm are found. Forests have almost everywhere been destroyed, but the chestnut tree clothes the sides both of the Alps and the Apennines, the nut in some districts supplying the chief food of the inhabitants.

Fauna. Italy is very low in the scale of European countries with regard to its fauna. The bear, genet, weasel, and some rodents are almost the only conspicuous examples in the way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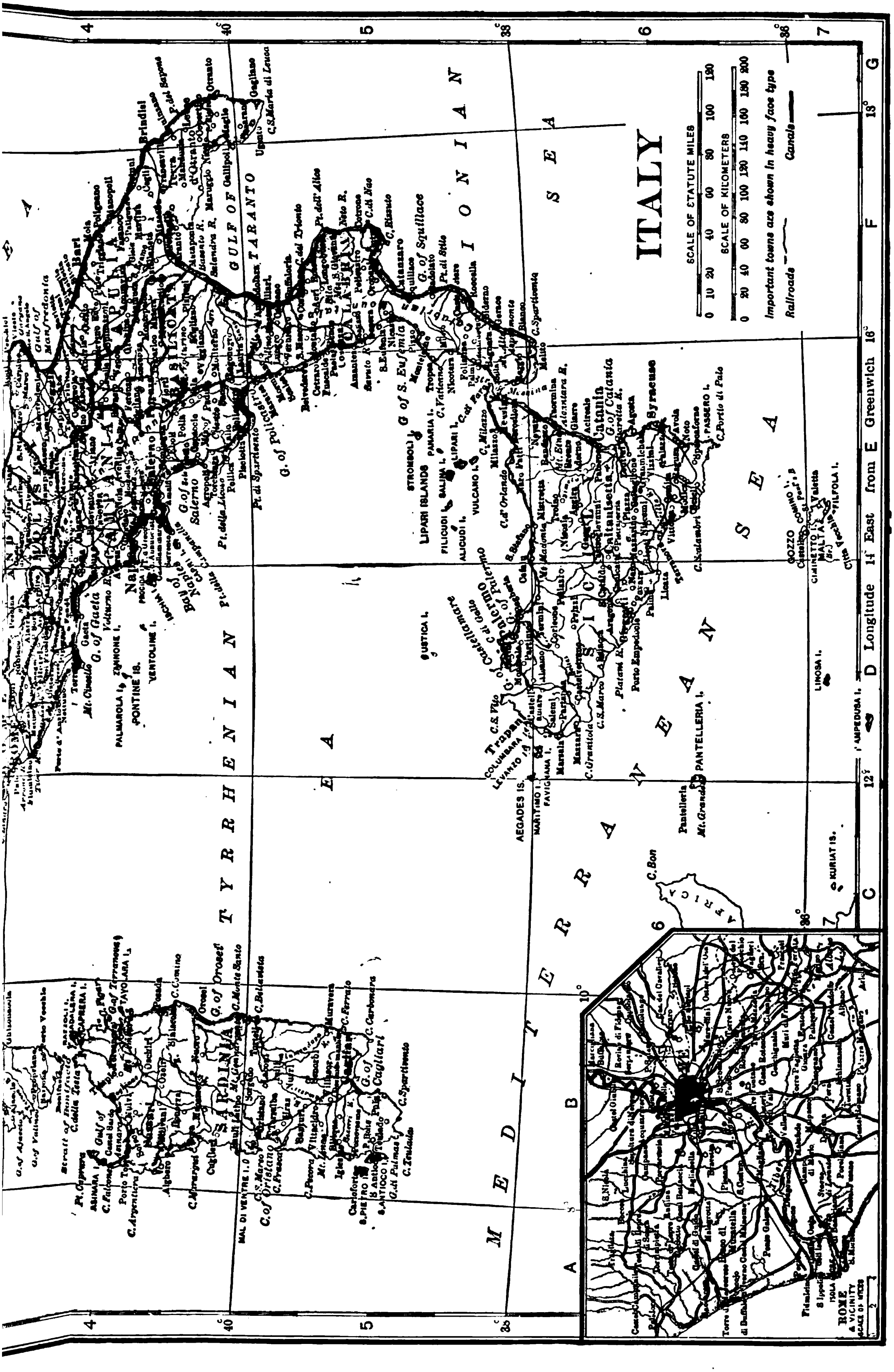
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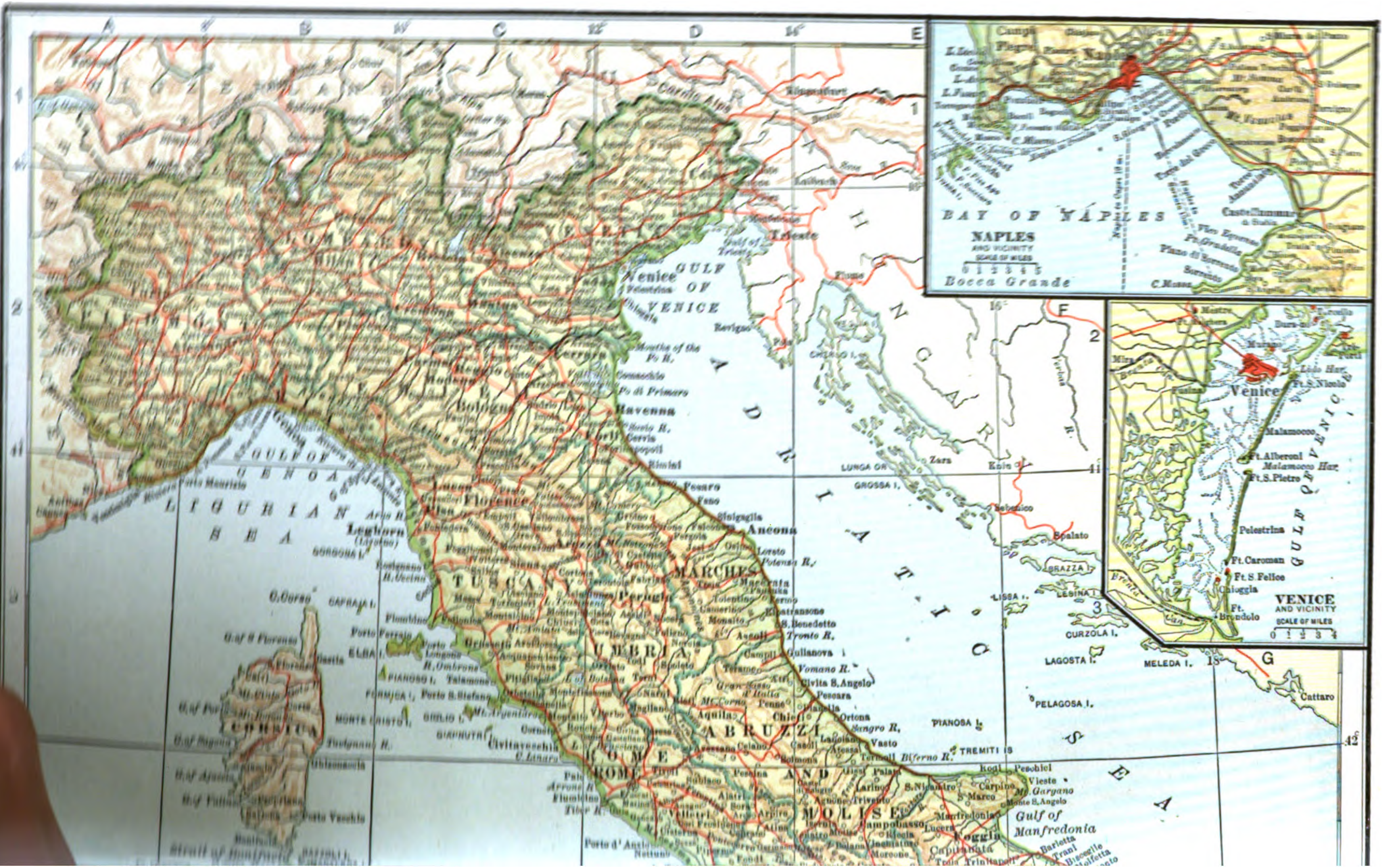
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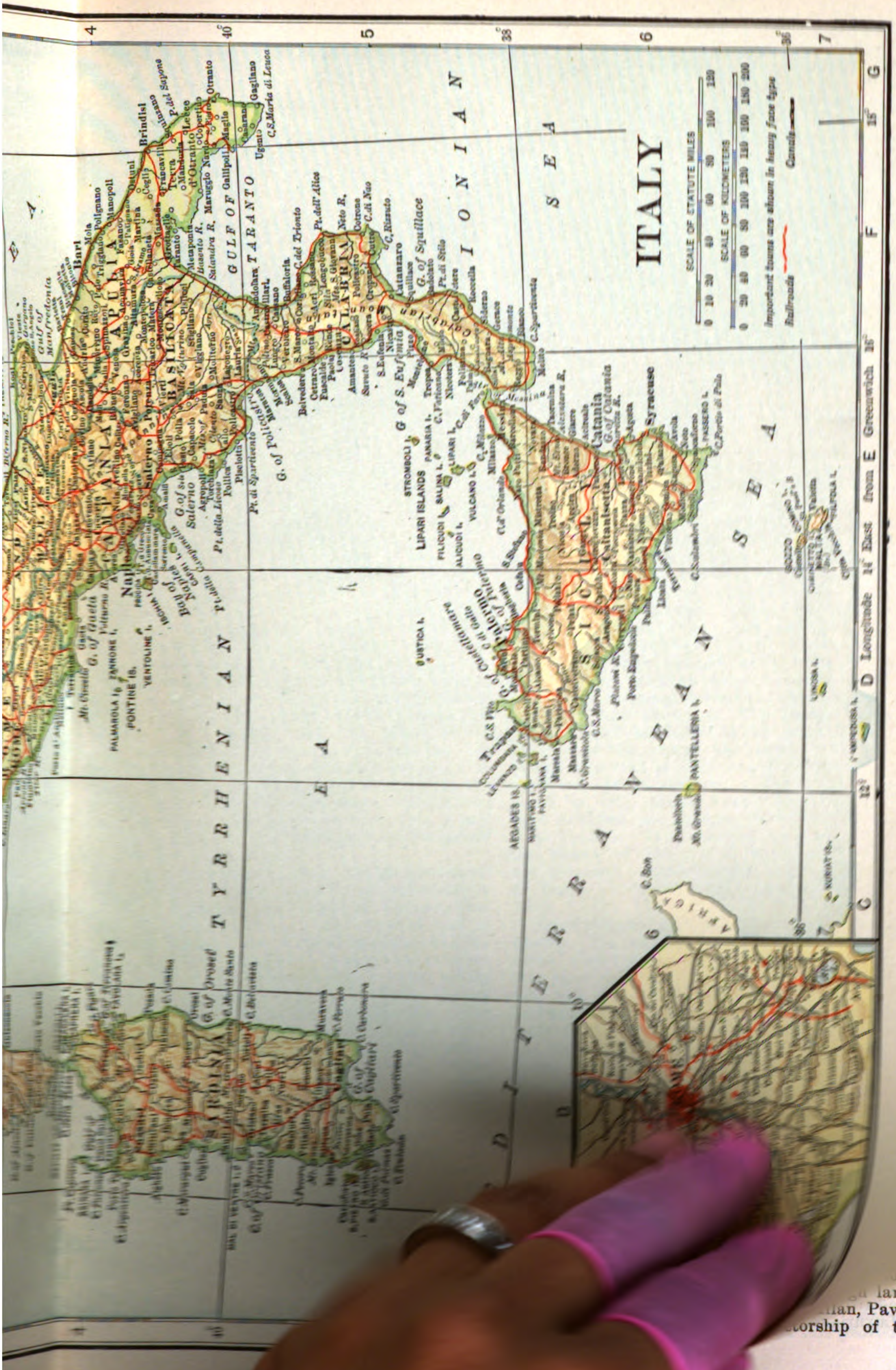

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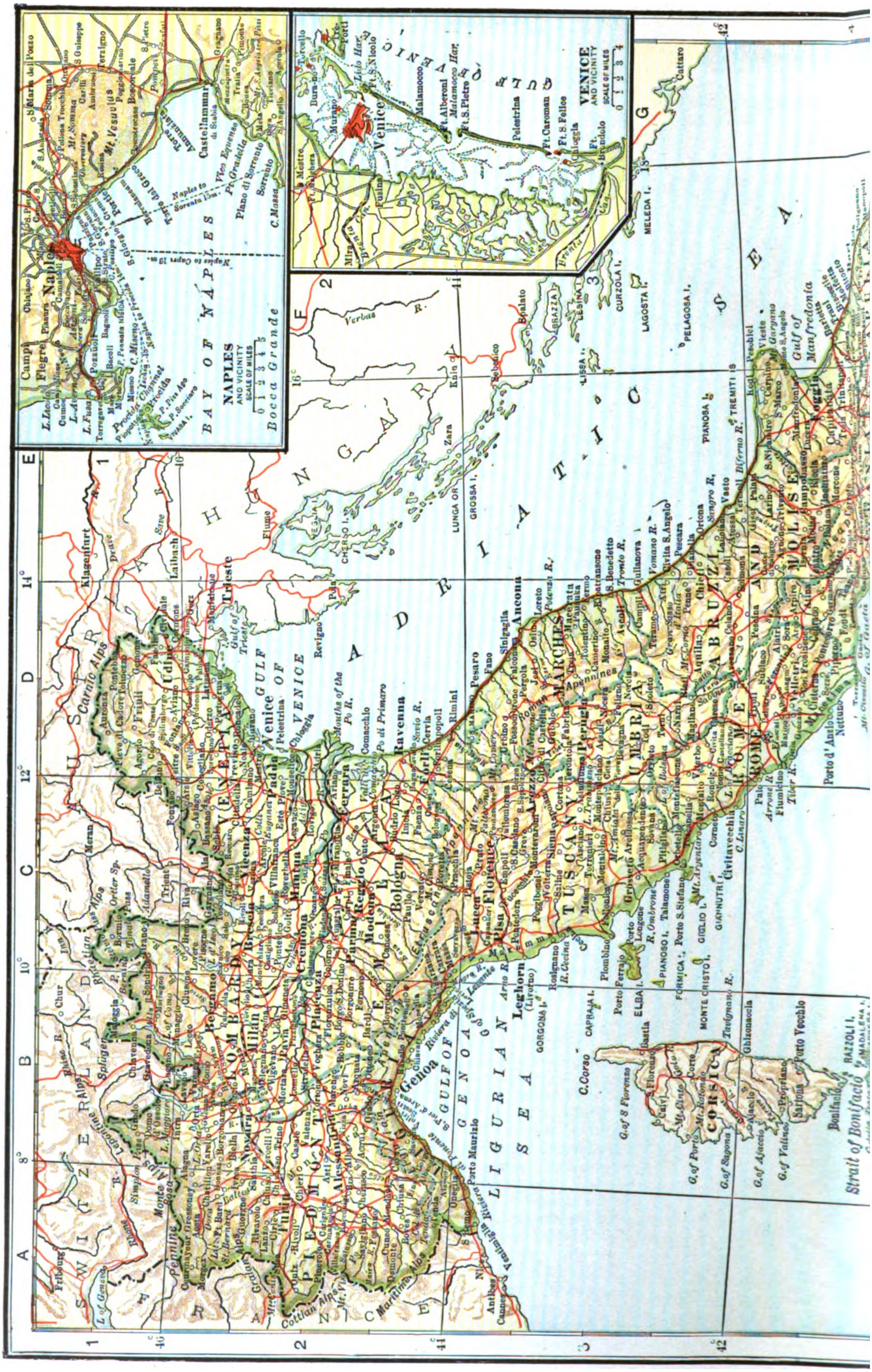
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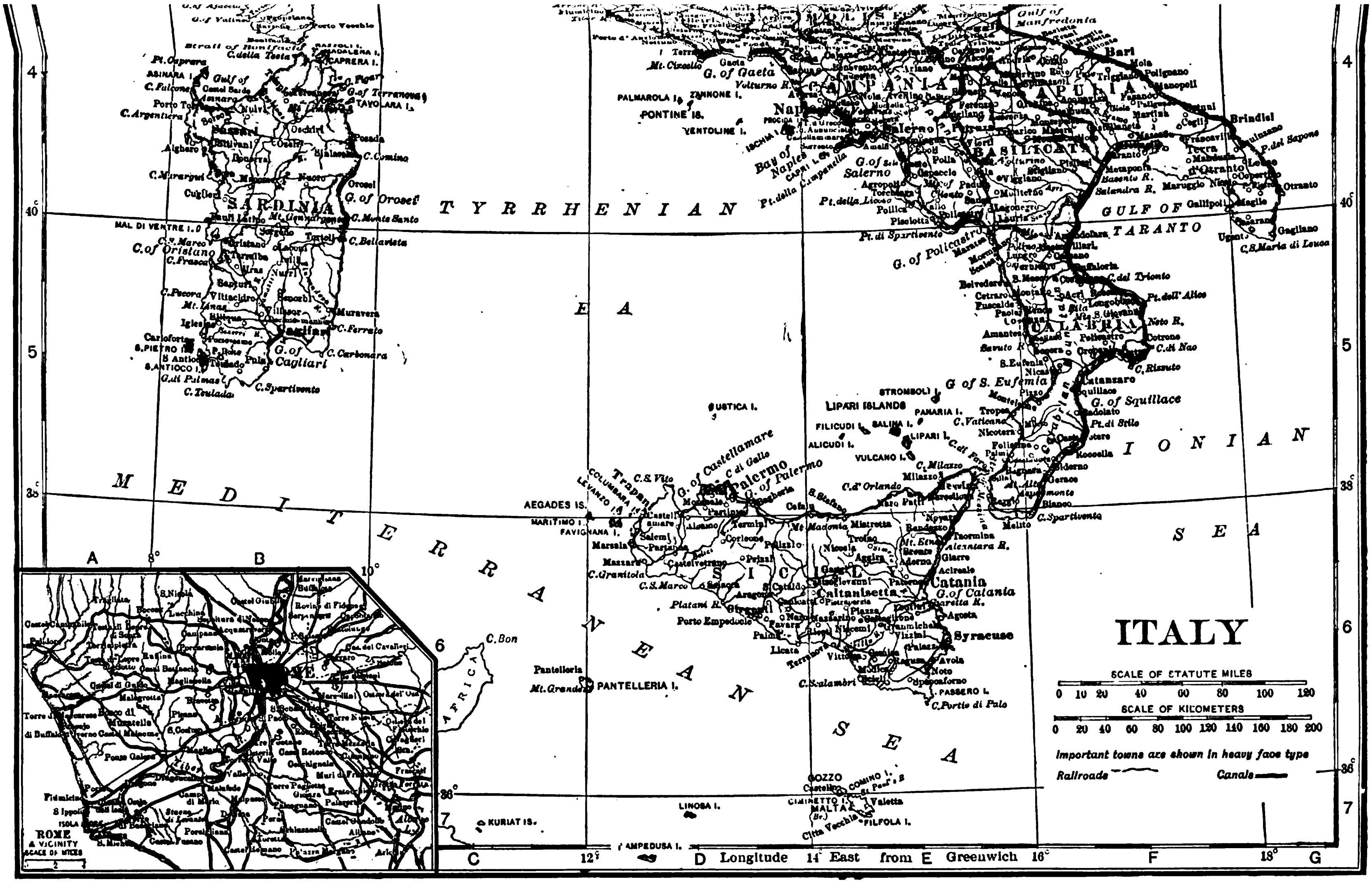
ITALY
SCALE OF STATUTE MILES
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GULF OF TARANTO
SARDINIA
SICILY
CAMPANIA
APULIA
BASILICATA
CALABRIA
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ROME & VICINITY
SCALE OF MILES
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SALINA I.
LIPARI I.
VULCANO I.
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ALICUDI I.
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PALMAROLA I.
ZANNONE I.
VENTOLINE I.
ISCHIA I.
PROCIDA I.
CAPRI I.
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G. of Salerno
G. of Policastro
G. of S. Eufemia
G. of Squillace
G. of Castellamare
G. of Palermo
G. of Catania
G. of Cagliari
G. of Orosei
G. of Terranova
C. of Oristano
Gulf of Manfredonia
Strait of Bonifacio
Mt. Etna
C. Spartivento
C. Passero
C. Rizzuto
C. Colonne
C. S. Maria di Leuca
C. Teulada
C. Carbonara
C. Passero I.
C. Portio di Palo
C. Scalambri
C. Granitola
C. S. Vito
C. S. Marco
C. Milazzo
C. d'Orlando
C. Vaticano
C. dell' Armi
Pt. dell' Alice
Pt. di Stilo
Pt. di Spartivento
Pt. della Licosa
Pt. della Campanella
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ASINARA I.
CAPRERA I.
TAVOLARA I.
S. PIETRO I.
S. ANTIOCO I.
MAL DI VENTRE I.

of mammals. The Alps and Apennines, and the swampy maremme of Rome and Tuscany, afford some refuge for wild life; but otherwise almost everything above an insect is killed for food or wantonly by the people. This has been the rule so long that the country is nearly bare even of small birds. Upon certain great estates a few animals, such as the native fallow deer, are preserved. Were not Italy, by its extension towards the south, a highway of migration to and from Africa for the birds, their absence would be still more complete. The autumn flight of quails from Tunis is a period of feasting. The sea life along the shores of the southern part is wonderfully varied and plentiful.

Geology. In its geological structure Italy represents a portion of the great system of mountain folds which extend across the Eurasian continent, and which are here diverted from the normal east and west direction to north and south. There is reason for believing that the peninsula once formed a continuous land bridge across the Mediterranean, thus uniting the ranges of the Alps with the Atlas. The uplifting of the Apennines took place at a comparatively recent geological period; Mesozoic and Tertiary strata including limestones, marls, and sandstones are the predominant formations. The islands off the coast of Tuscany, together with Corsica, Sardinia, and northeast Sicily, represent a much older land mass (Tyrrhenia), which, previous to the Tertiary period, occupied a large part of the depression now filled by the Tyrrhenian Sea. The great crustal movements that have determined the present configuration of Italy were accompanied by volcanic eruptions on an enormous scale. Evidences of these ancient outbursts are found in the Euganean and Brescian hills, near Padua; in the numerous vents along the west coasts of middle Italy, including Monte Amiata and the Alban Hills; and in the Phlegræan Fields of Campania. On the mainland Vesuvius is the only volcano now active, although eruptions have occurred in the Alban Hills within historical times. Sicily contains the great cone of Mount Etna (q.v.), and the Lipari Islands are dominated by Stromboli —both active volcanoes.

Mineral Resources. Italy has no great mineral wealth. A small quantity of anthracite is mined in Piedmont, and lignite in Umbria, Tuscany, and Sardinia; the total output of coal in 1912 was 663,812 metric tons, valued at $1,179,000. The most important mineral is sulphur, the output of which constitutes in value nearly one-third of all the mineral products, though the production has declined considerably. The richest sulphur mines are in the Sicilian provinces of Girgenti, Catania, and Caltanissetta; smaller deposits occur on the mainland, in the provinces of Forlì, Ancona, Avellino, and Pesaro e Urbino. Over 17,000 persons are engaged in extracting this mineral. The methods employed in procuring the sulphur range from the most primitive to the latest and most improved. Almost the entire world's supplies of this mineral are drawn from the Italian mines. In 1911 the production amounted to: sulphur ore, 2,682,766 metric tons, valued at $6,002,000; raw sulphur, 414,161 tons, valued at $7,775,000; refined sulphur, 166,802 tons, valued at $3,592,000; and powdered sulphur, 158,977 tons, valued at $3,847,000. The island of Elba yields an especially good quality of iron ore, which is largely exported to other countries. In 1912 the output of iron ore was 582,066 tons, valued at $2,395,000. Rich deposits of zinc ore are worked in Lombardy and Sardinia; the output of this mineral ranks second in value to that of sulphur, the total in 1912 being 149,776 tons, valued at $3,529,000. Quicksilver is mined in Tuscany, copper in Piedmont, Tuscany, and the Venetian Alps, and lead in the provinces of Genoa, Lucca, and in Sardinia. Small quantities of gold, silver, and antimony are also produced. Sicily and Calabria contain deposits of rock salt, while sea salt is made along the coast of Sicily and Sardinia. The marble quarries of Carrara, Massa, and Serarezza have a world-wide reputation. The quarries of Italy employed in 1912 nearly 71,000 persons, and their total output, including marble valued at $5,000,000, was valued at $12,402,000. The petroleum deposits of the Apennines, near Piacenza and other places, have been exploited since about 1893. The output of crude oil in 1911 reached 22,906,000 pounds.

Mineral waters suited for medicinal and bathing purposes are found at numerous localities in the Apennines and the volcanic regions. Among the popular resorts are Abano, Acqui, Bonino, Bagni di Lucca, Ischia, San Giuliano, San Pellegrino, Montecatini, and Posetta.

Fisheries. The sea and fresh-water fisheries of Italy are considerable and give employment to about 130,000 persons. The number of fishermen officially reported for the year 1911 was 127,792, of which total 6477 were engaged in deep-sea or foreign fishing, the remainder chiefly in the Mediterranean and gulf waters adjacent to the shores of Italy. The number of vessels and boats engaged in the same year was 28,402. The Mediterranean furnishes immense quantities of tunny, anchovies, sardines, mullet, pilchards, and mackerel. The Italian fisheries yielded about $4,830,000 in fish in 1911, but the imports of fish exceed the exports. The value of fish imported in 1912 was $11,020,000. This consisted almost entirely of fish dried or prepared in oil. Coral fishing formerly netted over $400,000 per annum; in 1910 it yielded only $14,500. It is carried on mainly along the coasts of Sicily and Sardinia. Sponges are obtained around Trapani and off the coast of Tunis. Tunny fishing produced $793,000 in 1910.

Agriculture. Agriculture is the principal industry. The area of Italy comprises 70,820,197 acres, only 7.4 per cent of which is unproductive land; 45.4 per cent being tilled land, 25.6 per cent pasture land, 4.9 per cent vineyards, orchards, etc., and 16.2 per cent forests. The most fertile and best cultivated lands are in the northern plain, drained by the Po, in Tuscany, in Campania, and in north Sicily, near Palermo. The poorest agricultural sections are in the country east of the Apennine Mountains, the marshy lowlands of south Tuscany and Rome, the plains of Apulia, and the hilly interior of Sicily. Extensive swamp areas, and the large, unproductive stretches of arid land which could be turned into fertile gardens and fields with proper irrigation, have made it necessary for the government to undertake large drainage and irrigation works, which have added about 6,000,000 acres to the productive area of the country.

The agricultural lands are, as a rule, divided into comparatively small holdings, though large farms exist in the vicinity of Rome, Milan, Pavia, and Cremona. Peasant proprietorship of the lands is common in Piedmont and Liguria, while in Tuscany, Umbria, and the Marches a system of partnership between owner and cultivator is practiced. In Lombardy and Venetia the rental system prevails.

Crops. Italy is favored above most countries by climatic conditions and is comparable to California in the great range of crops that can be grown, including both temperate-zone and tropical varieties. Like Florida, its peninsular position gives it the advantage of an insular climate, and though it is in a more northern latitude (Naples being on the same parallel with New York), it is not subject to severe freezes such as sometimes occur in Florida, the Alps to the north protecting it from the southward sweep of cold north winds. From the agricultural table appended it will be seen that wheat production has materially increased, the product of 1913 being nearly 50 per cent greater than in 1900. The production does not meet the domestic demand, and annual importations are necessary. Corn is also raised throughout the kingdom, the two most important districts being the provinces of Milan and Caserta. The other important provinces are Brescia, Cremona, Udine, Treviso, and Padua. This crop also shows an increase as compared with earlier years, but does not fully supply the home consumption, necessitating some importations. The cultivation of rice has somewhat increased within recent years and amounted in 1913 to 26,612,000 bushels. Oats, barley, and rye are also important cereal crops. Potatoes, turnips, beetroot, and sugar beet are of considerable importance. The production of hay, both from the natural grass meadows and the various cultivated varieties, is very extensive. Some hemp and flax are grown, but cotton cultivation has been reduced to insignificance.

In the agricultural economy of Italy fruit plays a more important part than cereals. The vines covered (1912) 11,002,368 acres. The government is spending large sums of money in combating the phylloxera and maintaining schools for teaching the art of wine making. The vine is grown all over the country, especially in the provinces of Bari, Alessandria, Lecce, Foggia, Rome, Catania, and Florence. The wines of Italy are of many kinds, but, owing to the defective methods of preparing them, they deteriorate with age and are to a great extent unfit for export. The best-known wines are the Marsala of Sicily, the Chianti of Tuscany, and the Asti of Piedmont. These are quite largely exported. The wine crop of 1913 was nearly double that of 1900. The olive tree thrives best in Liguria and throughout central and south Italy, as well as on the islands of Sardinia and Sicily. It occupies an area nearly one-half as large as that under the vine.

Luxuriant groves of orange and lemon delight the eye of the traveler in Sicily and Sardinia, adorn the coasts of Liguria, and thrive in the coast provinces of south Italy. The provinces of Messina, Palermo, Catania, Syracuse, Trapani, Calabria, Salerno, Catanzaro, Foggia, Caserta, and Naples are famous for the delicious fruit they produce. In 1911 the orange and lemon orchards had an area of 110,456 acres. Almonds are grown in south and insular Italy, and other fruits, such as figs, dates, melons, and pistachio nuts, are produced in large quantities and exported. Silk culture is no less prominent, giving Italy first place in Europe as a raw-silk producer and second only to China and Japan in the world. Its output makes up 80 per cent of the total European production and nearly one-fifth of the world's product. In 1913 the production of silk cocoons amounted to 72,312,000 pounds, which, however, was materially less than that of 1900. Silkworms are raised chiefly in north and middle Italy. The cultivation of mulberry trees is extensive, having developed in connection with the silk industry. The following table shows the fluctuations in the chief crops since 1870:

YEAR	Wheat (bushels)	Corn (bushels)	Rice (bushels)	Wine (gallons)	Olive oil (gallons)	Silk cocoons (pounds)	Tobacco (pounds)
1870–74*......	144,448,524	88,471,812	27,806,724	727,497,763	87,783,691	....	8,340,974
1879–83*......	132,142,956	84,188,018	20,663,478	971,088,920	89,553,630	91,651,636	13,531,281
1890..........	131,456,160	74,974,284	17,887,914	778,165,569	81,522,862	89,890,360	5,057,815
1900..........	127,795,140	86,275,200	16,886,100	789,868,300	39,440,581	111,342,300	12,401,148
1910..........	153,405,000	101,723,000	21,457,000	773,841,000	36,577,000	95,520,000	16,100,000
1912..........	165,721,000	98,669,000	21,532,000	1,165,599,000	24,172,000	91,933,000	39,683,000
1913..........	199,498,000	108,388,000	26,612,000	1,579,736,000	....	72,312,000	....

* Annual average.

The agricultural methods prevailing in north Italy are essentially the same as in other countries of western Europe, being characterized by intensive cultivation, the use of modern machinery, and the employment of the best methods of irrigation and fertilization. On the contrary, south Italy, though essentially an agricultural country, suffers from crude, primitive methods of cultivation. The Italian peasant is among the poorest in Europe. The prevalence of large estates and the presence of tenants and hired laborers who cultivate the land are characteristic features of Italian agriculture. No definite statistics are gathered on the subject, but it is estimated that the agricultural producers are made up of 40 per cent laborers, 40 per cent tenants, and 20 per cent owners. Since about the year 1900 a system of collective farming, i.e., leasing of farms by groups of laborers, has spread quite rapidly in the north, particularly in Emilia.

Stock Breeding. This industry is in a backward state. The only branch that may be said to be carried on in a rational way is the breeding of horses and horned cattle in the northern part of the country. The exports of horses, cattle, sheep, and swine, though small, exceed the imports. The production of wool is not sufficient to satisfy the domestic demand. Sheep raising is carried on most extensively in the poorer provinces of south Italy. In north or continental Italy extensive methods of cattle raising are followed, and stall feeding is common, but in peninsular and insular Italy open-field grazing prevails. In the north there is a considerable trade in dairy products, especially cheese—Gorgonzola, Parmesan, and Stracchino being among the famous brands. Coöperative methods are extensively used in the dairy industry. The raising of goats is confined to the hilly regions. Poultry and eggs are produced in large quantities and exported. The following table shows the number of live stock in Italy at different periods:

YEAR	Horses	Mules	Asses	Cattle	Sheep	Goats	Swine
1875–76	657,544	293,868	498,766	3,489,125	6,977,104	1,688,478	1,553,562
1881–82	660,123	302,428	674,246	4,783,232	8,596,108	2,016,307	2,064,000
1890	720,000	300,000	1,000,000	5,000,000	6,900,000	1,800,000	1,800,000
1908	955,878	1,238,060	1,238,060	6,198,861	11,162,926	2,714,878	2,507,798

The value of the products of the live-stock industry of Italy is estimated at about $285,000,000 per annum.

Forestry. About 11,277,000 acres, or 16.2 per cent of the total area of Italy, are under forests. Of this total area, 1,611,000 acres are in chestnuts. Only 129,095 acres of forests belong to the government, but a great part of the forest land is under government supervision, which is exercised by the Ministry of Agriculture through a staff who are unable, however, to prevent the devastation of forests. Since 1867 the government has been trying to offset the loss by planting new trees. The total value of the forest products is nearly $30,000,000 per annum.

Manufactures. The manufacturing industries of Italy have materially improved, owing to the utilization of the plentiful water power, especially at the north, by which electricity is rendered available for the operation of factories and small workshops. The industrial census of 1911 showed a total of 243,988 establishments employing 1,305,000 persons in the provinces having each as many as 5000 establishments. The most important branch of manufacture is the production of raw silk, which has been referred to under *Agriculture* in this article. The industry thrives especially in Piedmont, Lombardy, and Venetia. More than 500,000 people are employed in the raising of silkworms. Silk spinning and weaving are carried on mostly in the north—Lombardy, and especially the Province of Como, being the centre of the industry. The spinning and weaving of wool and cotton are on the increase, but the production is not sufficiently large to satisfy the home demand. The same is true of the manufacture of linen and jute articles. In 1911 the textile industries employed 657,190 persons. The iron and steel industry employs about 100,000 people exclusive of those employed in the mines. While it has reached such proportions, no great progress can be recorded in regard to its growth, owing largely to Italy's lack of sufficient mineral deposits.

In the manufacture of small metal ware, and especially of finer articles of bronze, silver, and gold requiring high artistic skill, Italy has long enjoyed a wide reputation, the beautiful work turned out by the workshops of Milan, Venice, Genoa, Rome, and Naples finding ready purchasers among lovers of art throughout the world. The same may be said of the finer varieties of pottery and glassware, especially the terra cotta, majolica, and faïence, and the mosaic, enamel, and pearl work of Venice, Genoa, Leghorn, Florence, and Rome. The marble and alabaster products are no less famous. Altogether some 90,000 people are employed in the above industries. The chemical industry employs over 6000 persons and turned out in 1912 about $55,000,000 worth of products, the most important single article of that industry being sulphuric acid. The paper and leather industries employ about 25,000 people, and the manufacture of straw hats and other straw-plaited goods gives employment to several thousand persons.

The manufacture of tobacco and of salt are government monopolies. The annual output of the former fluctuates between 37,500,000 and 40,000,000 pounds; that of the latter increased from 267,000 tons in 1871 to 389,000 tons in 1881, 419,000 tons in 1891, and 521,453 tons in 1911. The manufacture of alcohol, beer, and liquors, sugar, glucose, chicory, powder and other explosives, mineral oils, matches, gas, and electricity is subject to government supervision. None of these industries, however, has reached any large proportions. The sugar industry shows more signs of vitality than any other, although but of recent date in Italy. In 1898 there were only four sugar refineries, with an annual output of 8000 tons; in 1912 their number increased to 37, and the output to 159,000 tons.

Transportation. In 1913 Italy had a railway system with a total length of 11,015 miles. The mileage is the smallest of any leading country in Europe and is less per square mile of area than is common in western European countries. As a result of the peninsular position of Italy, the traffic of its railroads is mainly local, which has not justified the construction of a large mileage and is partly responsible for the financial difficulties which have overtaken the operation of the system, as below described. The Apennines, extending through the length of Italy, divide the railway system into two distinct groups, called the Mediterranean and Adriatic respectively. Each of these, as well as the respective lines of Sicily and Sardinia, was operated under the Law of 1885 by separate companies until July, 1905, when the government resumed the management of the state lines. The first railway in Italy was built in 1839, to connect the city of Naples with Portici, a distance of 5 miles. In 1860 there were 1118 miles, about one-fifth of which belonged to the state, the remainder being owned by seven railway companies. In 1869 the state undertook the construction of new railways and by 1870 owned nearly two-thirds of the total, 3962 miles. By 1879 the mileage had increased to 5228 miles, and as the growth of the system did not keep up with the needs of the country, there was a popular clamor for a more rapid construction of railways by the government. In 1879 a law was enacted with a view to meeting this demand, providing for the construction of upward of 3728 miles, at an expense of about $240,000,000. As the government found insuperable financial difficulties in trying to carry out this provision, it was compelled to give up the undertaking in a few years.

In 1885 an agreement was reached with three private railway companies, whereby the latter were to take over the three principal lines of the kingdom and were to be designated as the Mediterranean, the Adriatic, and the Sicilian Railway companies. By virtue of this agreement these companies were to have the operation of the government lines for a period of 60 years, either side, however, to have the right to terminate the contract at the expiration of 20-year periods. The companies paid the government the total sum of $53,000,000—$28,800,000 to be rebated by the latter for the extension and improvement of existing lines, and the remainder to be spent for the purchase of additional rolling stock and the construction of new lines. The companies paid all operating expenses, and, in addition, from 10 to 15 per cent of the gross revenue of each road was put into the reserve fund to offset the wear and tear on roads and rolling stock. The state received, moreover, 27½ per cent of the gross revenue of the continental roads, and 3 per cent on the Sicilian roads as rent, besides an equal share of all profits in excess of an annual dividend on the capital stock of 7½ per cent. The government might demand from the companies an annual expenditure of not more than $20,000,000 for new railway construction. The money was raised by issuing 3 per cent bonds guaranteed by the government. Upon the reversion of the lines to the government the companies were to be reimbursed the sums originally paid by them for the railways, with due allowance for the depreciation of the property.

This scheme had not resulted in a more rapid development of the railway system of Italy, the cost of construction having proved so high that it involved the government in financial difficulties. A parliamentary commission appointed in 1895 to investigate the method employed in the construction of nine lines elicited the information that the actual expense incurred exceeded the amount originally authorized by $30,000,000, the respective figures being $70,600,000 and $40,600,000, making an excess of 74 per cent over the sum authorized.

The length of the state lines now under government management is 8540 miles. The number of passengers carried annually increased from 34,040,515 in 1881 to 64,898,078 in 1902 and 82,407,600 in 1910.

Highways. Italy has an elaborate system of highways, divided into national, provincial, and communal, according to the source of their maintenance. In 1910 the length of the roads was about 92,200 miles, of which 5160 miles were national, 27,757 provincial, and 59,283 communal.

Communication. The postal and the telegraph systems are both in the hands of the government, though certain concessions are granted to railway and tramway companies in the telegraph service. For the year ending June 30, 1911, the number of letters and post cards transmitted, not including the governmental official letters, was 470,251,000. The number of private telegrams inland for the same year was 13,593,000, and an additional 3,322,000 were sent or received from abroad. The telegraph system includes a large number of submarine cables which connect different parts of the country. A net revenue is realized annually from the operation of the postal and telegraph systems. Both systems have been greatly extended and their use increased in recent years. The number of radiograms received by the wireless stations in 1911 was 14,129; number sent, 4470.

Commerce. The volume of Italian commerce was in 1913 more than double that of 1900. The remarkable growth is shown by the table which follows:

FOREIGN COMMERCE OF ITALY

YEAR	Imports	Exports
1871	$192,739,688	$217,091,913
1880	245,128,834	226,457,838
1890	275,457,286	192,520,070
1900	340,047,133	267,649,250
1905	369,209,000	308,221,000
1910	626,473,360	401,435,634
1913	702,089,724	483,255,329

The above figures apply to special commerce only, i.e., imports for home consumption and exports of domestic products. The transit trade is equal to about one-tenth of the special commerce. In 1888 a law was passed regulating the foreign commercial relations of Italy. This law, with some additional clauses, has remained in force down to the present time and is of a protectionist character. In 1891 and 1892 special treaties were concluded with Germany, Austria-Hungary, and Switzerland. They have proved beneficial to Italy. On the other hand, the commerce with France fell off considerably. Coal, raw cotton, wheat, and other cereals constitute over three-tenths of the import trade. Next in importance are machinery, silk (unbleached, raw, or twisted), timber for building purposes, hides (raw or dried), woolen manufactures, raw wool, and fish. Silk constitutes nearly one-fifth of the total exports. Next in the order of importance are cotton manufactures, fruit, wines, cheese, hides, raw hemp, eggs, sulphur, and olive oil. Germany occupies the first place in the Italian import trade, furnishing about one-sixth of its total imports. The United Kingdom and the United States follow with about one-seventh each. Then come France, Austria-Hungary, and Russia. The largest exports go to Germany and Switzerland, about 13 per cent and 11 per cent respectively. Switzerland secures its high rank in the export trade of Italy by virtue of its large importation of raw silk. Next in order of importance are the United States, France, Austria-Hungary, Great Britain, and Argentina.

In our own foreign commerce Italy holds the tenth place in the import trade and the sixth place in the export trade. The table below shows the development of Italian-American commerce since 1890:

YEAR	Exports to United States	Imports from United States
1891	$21,678,208	$16,046,925
1895	20,851,761	16,363,125
1900	27,924,176	33,256,620
1901	24,618,384	34,473,189
1903	36,246,412	35,032,680
1905	38,628,579	38,740,067
1910	49,868,367	53,467,053
1913	54,107,364	76,285,278
1914	56,407,671	74,235,012

The largest items of export to the United States are raw silk, sulphur, macaroni and vermicelli, olive oil, oranges and lemons, conserves, dry fruits, and marble. Unmanufactured cotton annually makes up about one-half of the total imports from the United States.

Shipping and Navigation. Italy has a large and active merchant marine. In 1911 it numbered 757 steamers of 697,000 tons capacity, and 4713 sailing vessels of 411,000 tons. The tonnage of sailing vessels is on the decrease, while the steam tonnage is increasing, as is shown by the table below. The peninsular position of Italy fits it admirably for a commercial nation. In the mediæval times, when the Oriental trade was prominent in European commercial life, the Italian ports attained the first rank. But with the decreasing relative importance of the Mediterranean traffic, when new trade routes were opened and new commercial fields became important, the Italian cities ceased to play a leading part in the world's commerce, and the Italian merchant marine is now inferior to that of either Germany or France.

THE MERCHANT MARINE OF ITALY

YEAR	Total vessels	Net tonnage	STEAMERS		SAILING VESSELS	
			No.	Net tonnage	No.	Net tonnage
1878...	8,590	1,029,000	152	63,000	8,438	966,000
1890...	6,732	821,000	290	187,000	6,442	634,000
1900...	6,074	873,000	409	315,000	5,665	558,000
1905...	5,596	1,032,614	513	462,259	5,083	570,355
1910...	5,459	1,107,187	718	674,497	4,741	432,690
1911...	5,470	1,107,985	757	696,994	4,713	410,991

These figures show at first a decline, which was not checked until 1897. Even the increased tonnage in 1900, viz., 873,000 tons, was far below the tonnage of 1878, which was not attained again until 1904. Still, Italy does a much larger part of its own shipping than some nations having a larger maritime trade. In the foreign oversea trade of Italy England has the first place, carrying (1912) nearly 36 per cent of the incoming and over 15 per cent of the outgoing merchandise. Italy itself controls about 21 per cent of the incoming and 41 per cent of the outgoing tonnage in the foreign trade. The remainder is distributed chiefly among Greece, Austria-Hungary, Germany, Norway, Spain, Holland, and Denmark. In coastwise shipping Italy controls about 98.6 per cent of all the merchandise transported. About 340,000 persons are employed in the merchant marine—an increase of more than 12 per cent in the last five years. Millions of dollars have been ineffectively paid out of the Italian treasury in ship subsidies to shipowners. The chief ports are Naples, Genoa, Palermo, Leghorn, Messina, Catania, and Venice. Ancona and Brindisi are also well-known seaports.

Banking. The banking system of Italy has been very unsatisfactory, owing to the general financial distress of the country and to mismanagement. Previous to 1893 there were six banks of issue—the National Bank of the Kingdom, the Bank of Naples, the National Bank of Tuscany, the Tuscan Bank of Credit, the Roman Bank, and the Bank of Sicily. In 1892 disclosures of illegitimate manipulations of bank funds and the collapse of the Bank of Rome precipitated a financial crisis. This institution was put into liquidation in 1903, and by the law of that year the National Bank of the Kingdom and the two Tuscan banks were consolidated as the Bank of Italy. The right of issuing bank notes was limited to this bank, the Bank of Naples, and the Bank of Sicily, which were chartered for 20 years from January, 1894. By the Law of Dec. 31, 1907, the amount of bank-note circulation, to be covered by a metallic reserve of 40 per cent, allowed to these banks was fixed at $175,244,000. The allotment to the Bank of Italy was $127,380,000, or 72⅝ per cent of the total, the remainder being divided between the other two banks. The banks, however, may issue notes in excess of their allotment when they have sufficient security in bullion or when advancing money to the government. The Bank of Italy was soon charged with the gratuitous handling of all the fiscal transactions of the Treasury in the provinces, saving to the state $240,000 annually. Thus, without being really a state bank, it performs some of the functions usually intrusted to such banks in other countries of Europe and is under strict government control and regulation. The capital stock of the Bank of Italy is nominally $60,000,000, although the paid-up capital amounts to only about $42,000,000, part of the difference having been absorbed by the losses of the Bank of Rome. The combined capital of the other two banks exceeds $21,000,000. The financial condition of the three banks of issue at the beginning of 1914 was as follows: cash and reserve, $291,400,000; deposits, $587,500,000; notes in circulation, $440,700,000; total assets and liabilities, $1,250,000,000.

In addition to these Italy has developed, with great success, a system of popular coöperative banks. These are associations of people of small means who combine their savings for mutual loans and credit and do a general banking business on a comparatively small scale, discounting commercial paper, workingmen's liens, treasury checks, etc.; keeping current accounts, and advancing loans "on honor," i.e., without any security whatever, to needy people who can bring recommendations of two members of the association.

The first bank of this kind was opened in 1865 in Milan as the result of the agitation of Signor Luzzatti. Ten years later there were 82 such banks with a membership of more than 77,000 and a capital and reserve fund of more than $9,000,000. In 1880 their number increased to 516, the membership to more than 250,000, and their working capital to nearly $18,400,000. In 1912 they numbered 862, with a proportionately increased capital and membership. Other banks operating in Italy are credit banks, agrarian credit companies built on the plan of the popular coöperative banks, crédit-foncier banks, savings banks, and government postal savings banks.

In 1912 there were 9799 post-office savings-bank offices, with 5,780,010 depositors and total deposits amounting to $376,072,000. There were in the same year 186 offices of the ordinary savings banks, with 2,363,832 depositors and deposits aggregating $480,965,000. At the beginning of 1913 the savings deposited with the coöperative savings banks and ordinary credit companies amounted to $244,423,000.

There are seven clearing houses in Italy, which increased in volume of business in the four years 1907–11 from $9,942,358,000 to $11,833,218,000, or about 19 per cent.

Finances. The finances of Italy are in a somewhat unsatisfactory state owing to the heavy interest payment on the large national debt and the heavy expense of its standing army and modern navy. Although the annual budgets of the government usually show a surplus, this is often achieved with the help of loans and always through burdensome taxation. It is an undoubted fact that Italians are heavily burdened with taxes of all kinds, and yet they apparently prosper and accumulate wealth. The indirect taxes include excise, customs, and octroi duties. To these should be added the revenues derived from the tobacco, salt, quinine, and lottery monopolies. These taxes and revenues altogether yield more than 45 per cent of the total revenue. The direct taxes, including a land, an income, and a house tax, furnish about 21 per cent of the total revenue. The inheritance tax, registration and stamp duties bring in about 13 per cent more. The remainder (21 per cent) is obtained from incomes from all kinds of public property and government works, such as public domains, railways, telegraphs, posts, etc.

The largest item of expenditure is the interest on the public debt—over $100,000,000 per annum, or about one-fifth of the total ordinary expenditure. The next largest item is the army and navy, which reached $206,500,000 in 1912–13 (or nearly two-fifths of the total expenditure). By contrast the expenditure on public instruction during the same year was $28,717,000 (or about 5 per cent), and on agriculture, industry, and commerce combined, but $6,098,000 (or slightly more than 1 per cent). Since 1885 the revenue and expenditure of the government have remained practically the same until recently, as is shown by the following table of the budget since the existence of the kingdom in its present limits:

YEAR	Revenue	Expenditure	Surplus (+) or deficit (−)
1871........	$249,847,591	$241,243,022	+$8,604,568
1881........	303,707,093	293,529,645	+10,177,447
1891–92.....	349,590,318	359,218,079	− 9,627,761
1895–96.....	367,950,702	368,277,331	− 326,629
1899–1900....	349,585,629	348,543,552	+ 1,042,097
1901–02.....	362,384,902	358,191,956	+ 4,192,946
1906–07.....	387,905,000	382,672,000	+ 5,233,000
1911–12.....	477,743,438	499,326,729	−21,583,291
1912–13.....	488,072,566	537,768,532	−49,695,966

The figures for the last two years show "effective" revenues and expenditures only. By means of financial operations the budget for 1911–12 was made to balance at $557,444,004, while the final accounts for 1912–13 showed a surplus of $633,802. To what an extent all other public interests have been neglected for the sake of military expenditure may be seen from the table in the next column, which shows the increase of expenditure for military purposes, for the payment of the debt, and the total expenditure.

The expenditure for military purposes decreased since 1896, when it reached $86,000,000, owing to the defeat of the troops in Africa and the consequent contraction of military operations. But the increase of expenditure on that item in recent years has been enormous, to the detriment of such vital interests as public institutions, sanitation, industry, agriculture, commerce, etc. The expenditure of the state for public instruction amounts to about $26,000,000 annually, mostly on higher education.

YEAR	Expenditure army and navy	Service of public debt	Total expenditure
1871...........	*33	*88	*241
1881...........	45	97	293
1891–92........	67	128	359
1901–02........	77	138	358
1906–07........	80.4	128.8	382.7
1911–12........	163	98.4	499.3
1912–13........	206.5	101.3	537.8

* Millions of dollars.

Local Finances. In both commune and province expenditure is classified as "obligatory" and "optional," the former including the maintenance of roads, education, police, and matters considered indispensable. In 1899 the revenue of the communes of Italy amounted to $128,401,829, while that of the provinces was $26,335,265. No complete data are available for later years. In 1907 the ordinary revenues of the communes amounted to $97,386,107. The largest items in the communal revenue are (1) the gate tax, or octroi, which is partly a duty on certain articles not otherwise taxed, and partly a surtax not to exceed 50 per cent of that levied upon certain commodities at the frontier; and (2) a surtax upon lands and buildings, also limited to a maximum of 50 per cent of that levied by the state. Of less importance are the levies made upon family incomes, live stock, etc. The bulk of the provincial tax is secured from a surtax upon land and buildings, which is likewise limited to 50 per cent of the state assessment. The expenditure and indebtedness of both the communes and the provinces have greatly increased during the last two decades.

As an illustration of the immense tax burden in Italy may be cited the land tax, which altogether, national, provincial, and communal, amounts to nearly one-fourth of the landowner's revenue. Under the cadastral survey which served as the basis of the land assessment prior to 1886, the burden of this tax fell with great inequality upon different parts of the country. But a law passed in 1886 authorized a new survey, which was quickly made in the provinces which were unjustly burdened, thereby securing a measure of relief. But the provinces which would not profit by the survey have been slow to make it (in some provinces the increase amounted to over 90 per cent). Hence the revenue yielded by the land was lessened in consequence of the law. The income tax, which is proportional, does not apply to incomes obtained from the land, but only upon those from movable capital and from labor.

Public Debt. The growth of Italy's debt and interest charges thereon since 1870 has been as follows:

YEAR	Debt	Interest
1870......................	$1,663,744,800	$77,682,800
1890......................	2,413,513,400	111,468,600
1900......................	2,529,057,800	115,967,000
1904......................	2,403,772,000	110,785,000
1913......................	2,754,420,000	96,585,000

(The seeming discrepancy between the interest figures in the above table and the one preceding is due to the fact that the one gives the interest charges only, while the other gives the total service of the debt, which includes amortization.) The table shows that the debt increased more than 65 per cent in the period indicated, making it the fourth largest public debt in the world. It is next to that of France, of Great Britain, and of Russia, all of which countries have far greater resources than Italy. In fact the per capita debt of Italy, $78.16 in 1913, is greater than that of any of the countries mentioned except France, where it was $160.25 during the same year. It is, however, less than in some countries, e.g., Spain, where the figure is $90.97; Portugal, $174.74; Belgium, $108.92.

Navy. The Italian navy was formed by the consolidation of the fleets of Sardinia and the Two Sicilies (1861). The importance of naval power to the newborn kingdom was fully appreciated. A dozen armor-clads and a large number of cruisers and smaller vessels were built in the next half-dozen years. The largest of the armorclads, the *Re d'Italia* and the *Re di Portogallo*, of 5700 tons, were built at Webb's Yard, New York. Of the others, six were of about 4000 tons, two of 2700, and two of 2200.

The overwhelming defeat at Lissa in 1866 was a severe blow to Italian naval development. But early in the next decade the reorganization and rebuilding of the navy began. From that time until the present the Italian navy has led the way in many of the greatest advances in battleship construction. The *Duilio*, launched in 1876, was not only larger than any existing warship, but she carried much heavier armor and enormously larger guns. The *Duilio* was quickly followed by a sister ship, the *Dandolo*, and a little later by two larger and faster vessels with less armor. In some respects these may be regarded as the prototype of the battle cruiser of to-day.

By 1890 the Italian navy had advanced to third place in fighting strength, and the annual expenditure to nearly $25,000,000. The financial condition of the nation then demanded economy, and no more large ships were launched until 1897. The cessation of building caused the Italian navy to decline in relative power. At present it is sixth in strength and is very nearly equal to that of Japan. In 1901 two battleships were put in the water, two in 1904, one in 1905, one in 1907, and four heavy cruisers in 1907-08. In 1910 the first dreadnought was commenced, followed by three in 1911 and two in 1913; two have been commenced, and two more will be laid down before the middle of 1915.

The present building programme, approved by the Italian Parliament, provides for the immediate laying down of four battleships to be completed in 1917 and thence onward to begin one each year. This programme will result in the permanent maintenance of a fleet of 20 first-class battleships of less than 20 years of age. The necessary numbers of cruisers, destroyers, submarines, auxiliary vessels, and air craft are included in the programme.

The head of the navy is the Minister of Marine (an admiral), who is assisted by the superior council of the navy, which is composed of one vice admiral (or admiral) president, three vice admirals (or rear admirals), one director general of the civil *personnel*, members; one rear admiral (or captain) who is a member and secretary; and lastly, the chief of the bureau or office whose affairs are under consideration. The Navy Department is divided into the following branches: (1) cabinet of the Minister, which coördinates the branches; (2) general staff, which has charge of the preparation of plans and arrangements for everything that pertains to the readiness of the fleet for war, including operations, exercises, manœuvres, strategy, tactics, organization, mobilization, etc., and it is also concerned with the composition of forces afloat, building programmes, and design of ships—as many of these matters are determined by special boards, the chief of the general staff is a member of the boards; (3) *personnel;* (4) naval construction; (5) armament and equipment; (6) merchant marine; (7) hydrographic service; (8) medical department; (9) military engineering (fortifications, works, etc.); (10) office of revision; (11) accounts. The naval academy and college are located at Leghorn. The principal dockyards are at Spezia, Castellamare, Venice, Taranto, and Naples, and there are naval stations at Genoa, Messina, Licata, Cagliari, and Palermo.

The fleet is organized as follows:

[NOTE. Displacements are given in thousands of tons; thus, 12.5d is 12,500 tons; 4g12 means that 4 12-inch guns constitute the main battery; 30k means 30 knots' speed; 3t, 3 torpedo tubes; a.c., armored cruiser; b.s., battleship; c., cruiser; des., destroyer; sub., submarine; * means dreadnought b.s. or c.]

FIRST SQUADRON

FIRST DIVISION

B.S.

*Dante Alighieri: 19d-12g12-23k
*Giulio Cesare: 22d-13g12-23k
*Leonardo da Vinci: 22d-13g12-23k
*Conte di Cavour: 22d-13g12-23k

SCOUT

Nino Bixio: 3.5d-6g4.7-29k

DES.

Four: 0.68d-2t-30k

SECOND DIVISION

A.C.

Giuseppe Garibaldi: 7.2d-1g10, 2g8-20k
Varese: 7.2d-1g10, 2g8-20k
F. Feruccio: 7.2d-1g10, 2g8-20k
Vettor Pisani: 6.4d-12g6-19k

SCOUT

Coatit: 1.2d-12g3-23k

DES.

Four: 0.38d-3t-29k

THIRD DIVISION (Training)

B.S.

Benedetto Brin (gunnery): 13d-4g12-20k
Regina Margherita: 13d-4g12-20k

A.C.

San Marco (gunnery): 9.6d-4g10-23k
Carlo Alberto: 6.4d-12g6-19k

GUNBOATS

Liguria
Miseno
Palinuro

Second Squadron

FIRST DIVISION

B.S.

Regina Elena: 12.5d–2g12, 12g8–22k
Vittorio Emanuele do
Roma do
Napoli do

C.

Quarto: 3.2d–6g4.7–28k

DES.

Four: 0.68d–2t–30k

SECOND DIVISION

A.C.

Pisa: 10d–4g10–23k
Amalfi: 10d–4g10–23k
San Giorgio: 9.6d–4g10–23k

C.

Marsala: 3.5d–6g4.7–29k

DES.

Four: 0.38d–3t–29k

Two battleships of 9600 tons are placed in reserve and three older ones (12d to 15d) relegated to coast defense. There are 14 small cruisers available for service, some in commission, others in reserve. There are 43 destroyers completed, 3 building; 20 submarines, 6 building; 75 small torpedo boats, many unfit for service; and 37 large merchant steamers are subventioned and may be taken into service in case of war. An aviation service was organized in 1912.

The *personnel* of the navy consists of 1 admiral, 18 vice admirals, 14 rear admirals, 131 captains and commanders, 1331 other line officers (including engineer officers, recently combined with the line), 257 medical officers, 239 pay officers, 110 naval constructors, 1136 warrant officers, and 38,000 enlisted men. The naval estimates for 1914–15 are 260,284,575 lire ($50,234,922.98), which sum is slightly less than that voted for the previous year. The outbreak of the Great European War may cause a considerable increase in these figures. See NAVIES.

Army. The Italian military system is complicated and requires a careful study of the conditions of service to arrive at a nearly correct estimate of the number of fully trained men available for the initial mobilization. Owing to the custom of granting unlimited leave to large numbers of men, the regular army is often short, by several thousand, of the full number provided by law for the peace establishment. Owing to insufficient budgets, the training of the several categories of militia has often been incomplete or altogether omitted.

Service, though universal and compulsory, is not the same for all the men of military age. Liability extends from the 20th to the 39th year. The men of 20 each year are divided into three classes and disposed of as follows: first, those that fill the vacancies in the regular army, in which service is for two years; then six years in the reserve on unlimited leave; then four years in the mobile militia; then seven years in the territorial militia, making a total liability for service of 19 years, ending at the age of 39. Second, the eligible men of 20 for whom there are no vacancies in the regular army are assigned to the *complementary force* for eight years, where they receive from only two to six months' training for the entire period. They then pass to the mobile militia and then to the territorial militia for four and seven years respectively, which completes their 19 years' service. Third, the men of 20 who are exempted from active service are assigned direct to the territorial militia, where they receive only 30 days' training. The men who have passed through the regular army are supposed to receive about 30 days' training per year while in the reserve and mobile militia and a less amount while in the territorial militia.

Higher Organization.—These are 12 army corps (25 divisions) and 3 cavalry divisions organized in peace.

Infantry.—Typical formations are 4 companies to the battalion, 3 battalions to the regiment, 2 regiments to the brigade, 2 brigades to the division. To each division is attached 1 regiment of field artillery (5 batteries of 6 guns each). Total war strength of the division, about 14,000 men, 1400 horses, 30 field guns. To the army corps of two divisions are attached 6 light batteries, 3 heavy batteries, a regiment of cavalry, and a regiment of light infantry (Bersaglieri), having 4 battalions, one of which is a cyclist battalion. In addition to the above there are 26 battalions of Alpine infantry, to which are attached 36 mountain (pack) batteries. The war strength of the infantry company varies from 120 to 150 in Bersaglieri and Alpine troops to 250 men in the line companies. Total peace strength of infantry (389 battalions and 88 district headquarters), 7627 officers, 162,000 men.

Cavalry.—There are 3 independent cavalry divisions, each consisting of 2 brigades of 2 regiments each and 2 horse batteries. Total cavalry, 150 squadrons and 29 depots, making a total of 1006 officers, 27,416 men, 25,467 horses. A regiment in peace consists usually of 5 squadrons of about 150 men each, with 4 officers.

Artillery.—There are 263 field batteries (light, heavy, and mountain) and 110 companies of coast and fortress artillery, also 51 artillery depots; total, 2359 officers, 49,256 men. The light field-artillery regiment may have 5 or 6 batteries and 2 battalions; the battery, 6 guns. The strength of batteries varies from 3 officers and 90 men to 5 officers and 150 men; companies from 3 officers and 107 men in peace to 5 officers and 200 men in war. All artillery officers are on one list, from which they are assigned to field, fortress, and seacoast artillery.

Engineers are organized as 6 regiments: 2 of pioneers, 1 each of pontoon troops, telegraph troops, sappers, and railway troops. The 82 companies and 10 train companies amount to a total of 630 officers and about 11,000 men. The companies vary in strength from 3 officers and 110 men in peace to 5 officers and 250 men in war.

Sanitary Troops.—There are 12 companies. Total, 769 officers and about 3700 men.

Supply Train.—There are 12 companies, one for each of the 12 army corps. Total, 452 officers and about 4000 men.

Military Police.—The Carabinieri are organized as 12 legions, with a total of 709 officers and about 30,000 men. About 4000 are mounted. In war they would furnish about 1 infantry brigade of 7000 officers and men for field service.

Special Formations.—For administration, staff duty, military schools, etc., there are 1284 officers and about 1900 men.

Aëronautical Service.—This is being developed and at the end of 1914 is to supply 30 field squadrons of 7 aëroplanes each, or a total of 210, for use with the field army. In addition there are about 10 serviceable airships. The *personnel* is organized into sections, battalions or squadrons, in accordance with the duties required. There are a specialist battalion of 5 companies, an experimental section, a flying battalion of 2 companies, and the field squadrons above mentioned.

Total Peace Strength.—According to the latest data available in 1914, this amounted to 15,172 officers, 289,500 men, 64,345 horses. Owing to the system of giving unlimited leave to men supposed to be serving with the colors, it is doubtful if more than 250,000 men were actually with their regiments at any one time.

Total War Strength.—The complex system, insufficient budget, and indefinite leaves to individuals of all the categories, before training is completed, render it difficult to estimate Italy's strength in *fully trained* men. On paper she could mobilize 3,500,000 men, actually not more than 1,500,000 *fully trained.* Assuming that the *initial mobilization* would be confined to existing organizations of the regular service, the fighting strength of the three arms on initial mobilization would be: infantry rifles, 325,000; cavalry sabres, 25,000; field guns (all calibres), 1600.

Arms.—Infantry, Mannlicher Carcano rifle, 6.5 mm. calibre, using a magazine. The territorial militia uses the old Vetterli. The field artillery is being rearmed (1914) with the De Port gun and carriage, considered the best in Europe. See FIELD ARTILLERY.

Colonial Troops.—In addition to the troops already mentioned Italy maintains colonial troops in her African possessions, as follows: in Libya (Tripoli and Cyrenaica), about 3000 Italian and 10,000 native troops; in the Colony of Eritrea (Erythræa), about 600 Italian and 8000 native troops; in Italian Somaliland, about 4700 soldiers in all, mostly native. The native troops have a proportion of Italian officers.

Budget for 1913–14, $71,110,000.

The critical political position of Italy between the opposing influences of the Triple Alliance and the Triple Entente, in the European War of 1914, undoubtedly induced Italy to put her military house in order for any eventuality.

Frontiers.—The total land frontier adjacent to France, Switzerland, and Austria-Hungary is about 1200 miles. The coast line, including Italy proper, Sicily, Sardinia, Elba, and other small islands, is a little over 4000 miles. Land fortifications are located in the principal passes of the Alps and in the basin of the river Po. Among the latter are Casale, Piacenza, Verona, Mantua, Venice, and Alessandria. On the coast of the peninsula and islands there are Vado, Genoa, Spezia, Monte Argentaro, Gaeta, all strongly fortified. Taranto, in the Strait of Messina, is also fortified. The naval station of Maddalena consists of a number of fortified islands. Rome is also protected by forts.

Government. The existing constitution of the Kingdom of Italy is the *Statuto fondamentale del Regno*, which was originally issued (March 4, 1848) as the constitution of the Kingdom of Sardinia. When Sardinia expanded into united Italy, its organic law was adopted by the new nation. This constitution has never been formally changed or revised; in fact, no provision exists for its amendment, and constitutional changes have been made by the ordinary methods of legislation, as in England, which has been the political model of the Italians.

The throne is hereditary in the house of Savoy on the principle of the Salic Law; the King attains his majority at the age of 18. The official residence of the royal family is the Palazzo del Quirinale in Rome. The King's salary is 16,050,000 lire a year, from which he returns to the government 1,000,000 lire. His person is declared inviolable. Like the King of England, the Italian monarch's powers are great in theory, but very much limited in practice; for Italy, according to her constitution, is a "representative monarchical government." The King does not veto any bills passed by Parliament, although he has a theoretical right to do so, and very seldom does he attend cabinet meetings. Only in the field of foreign affairs does he exercise any real influence. The reigning monarch, Victor Emanuel III, is very democratic in his ideas and manners and is popular amongst all classes of Italians, even with the Republicans and Socialists.

The cabinet consists of 11 members and their undersecretaries. These are: Foreign Affairs, War, Marine, Finance, Education, Internal Affairs, Treasury, Public Works, Justice and Ecclesiastical Affairs, Commerce, Industry, and Agriculture, Posts and Telegraphs. According to the constitution an Italian citizen does not need to be a member of Parliament to be chosen a cabinet minister, although it is customary to choose only members of Parliament, particularly from the Lower House. Like the British and French cabinets, the Italian is directly responsible to the Chamber and must resign on an adverse vote. The Premier is generally the leader of the most powerful political group. In theory it is the King who chooses the cabinet; in practice it is the influential politicians in the Chamber. The cabinet administers the laws, appoints officials, conducts foreign affairs, and initiates all important legislation. In no country, not even in England, is the cabinet so powerful as it is in Italy, where it dominates Parliament, which has not the same prestige as it has in England and in France. Frequently administrative ordinances issued by the cabinet take the place of parliamentary legislation.

The Senate is at present composed of 383 members, appointed for life by the King on nomination by the cabinet. A seat in the Senate is not hereditary, and it is required by law that appointments should be made from certain categories, like high officials in church and state, men distinguished in art, science, or literature, and wealthy property owners. No man below 49 years old can be appointed. The Senate is a body of great dignity and influence, but of little legislative authority, as the parties in power often resort to swamping the Senate with their friends and adherents. Seldom does it initiate legislation or even seriously oppose bills sent up from the Chamber; it contents itself mainly with revising, amending, and suggesting. In legislative authority it is inferior even to the French Senate. Proposals to reform the Italian Upper House are constantly being made, and an elaborate report on this subject was submitted to Parliament in 1910, which suggested the inclusion of an elective element and a widening of its powers. The President and Vice President of the Senate are named by the King, i.e., the ministry. The Senate is empowered to act as a High Court of Justice to try cases of treason and impeachment.

The Lower House, or Chamber of Deputies, is composed of 508 members chosen by the legally qualified voters as determined by the Franchise Law of 1912. At first the suffrage was restricted to those having property and education, but it has been gradually extended until now there is virtually universal suffrage. The great electoral reform carried through by the Giolitti ministry in 1912 gave a vote to all male citizens over 21 years of age who can read and write and to all illiterates over 30 years old. Many Italians abstain from voting partly because they are not as yet accustomed to parliamentary government and partly because of the attitude of the Catholic church towards the nation. In 1883 Pope Pius IX issued the decree *Non Expedit*, which forbade faithful Catholics to participate in the elections, in order not to recognize what the Pope claimed as a "usurping" government. In recent years the growth of Socialism in Italy has so frightened the papacy that Pius X issued a decree in 1905 permitting voting by the faithful, but only by the special consent and direction of the hierarchy. The Chamber is elected by secret ballot in single-member constituencies. Candidates must receive a majority of all the votes cast in order to be declared elected. If not, second balloting takes place one week later between those who came out on top of the poll. Although the term of office is five years, the Chamber may and often is dissolved before its term has expired. Sessions are public. Interpellations are frequent, but a vote on the question must be taken only after an interval of several days. This has prevented frequent changes of ministry.

In Italy, as in all other countries of continental Europe, there are no two powerfully organized political parties striving for the control of the government; instead, there are a number of loosely organized groups that combine and recombine whenever it suits their temporary interests, which are largely personal in character. A striking feature of Italian politics is the absence of a historical conservative party, because in 1870 the most conservative elements of society were opposed to the unification of Italy. Hence the Liberal party is split into Right and Left wings. In recent years, because of the fear of Socialism, a conservative clerical party has been organized. There is still in existence a Republican group advocating the ideals of Mazzini, but it exerts very little influence in Italian politics. The popular parties, like the Radicals and Socialists, are a rapidly growing force, particularly the latter, which rose from 12 seats in the Chamber in 1895 to 78 in 1913. The petty and personal character of Italian politics disgusts many electors, who either do not vote at all or are glad to give their support to comprehensive principles as embodied in Socialism, which is most ably expounded by distinguished writers like Labrioli and Ferri. As no single party has a majority in the Chamber, the government must find its support in a coalition of groups, which is called a *bloco*. This at present consists of Liberals and Radicals.

The administrative system, both central and local, is fashioned largely after that of France. Historical subdivisions have been replaced by artificial areas, and local self-government is superseded by a centralized administration. The power of the higher administrative officials to issue ordinances for the purpose of supplementing the statutes has been carried even further than in France and in many cases has the effect of suspending or displacing the statutes. An organ of restraint upon the action of the government in this respect is found in the Council of State and the several courts of accounts. The former is chiefly an advisory organ, but it also has power to prevent arbitrary action of the central government in the removal of local officials; the courts of accounts exercise supervision over various activities of the administration, and their approval is necessary to the validity of all decrees and orders which involve the expenditure of more than 2000 lire. The seat of government of Italy is Rome. From 1865 to 1871 the capital was Florence, which had superseded Turin.

For the purpose of local government Italy is divided into artificial circumscriptions called provinces, circondari, mandamenti, and communes. The chief executive officer in each province is the prefect, appointed by the King, and under the control of the Minister of the Interior. He is therefore the agent of the central government, and in this as in other respects corresponds to his French prototype. He is charged with the publication and execution of the laws, takes measures for the public safety, disposes of the armed forces, issues police ordinances, and supervises and directs the subordinate officials of the province. To advise and assist him in the discharge of his duties a prefectural council over which he presides is provided. The deliberative assembly of the province is the Provincial Council, chosen for five years by an electorate which is somewhat restricted, but which has been extended. The size of the Council varies according to the population of the province. It meets at the capital of the province once a year, it elects its own officers, and all resident taxpayers are eligible to its membership. Its sessions are opened by the prefect, who has the right to preside over them and to suspend them for a limited period. It has a wide power of local legislation relating to such matters as the creation of highways, establishment of societies, public institutions, the care of provincial property, schools, poor relief, the budget, loans, besides a supervisory authority over the civil service. There is also in each province a provincial deputation elected by the Provincial Council and presided over by the prefect. It represents the Council during its recess, superintends the enforcement of its resolutions, prepares the budget, exercises a disciplinary control over inferior officers, and performs a variety of local duties under the direction of the Council.

The circondario plays an unimportant part in the local administration. Its chief officer is an underprefect, who represents the central power. The mandamento is a judicial district for the pretor, and, like the circondario, is of little consequence as an administrative area.

The commune is the lowest administrative unit, and, like the province, has its own elected council. The chief executive officer in the commune is the syndic or mayor. By a recent law the syndics of all the communes, irrespective of their population, are chosen by the communal councils from their own membership. The functions of the syndic are twofold: he is the local municipal magistrate and at the same time the agent of the central government in the commune. As mayor, he presides over the Council, executes its ordinances, is the custodian of communal property and institutions, and takes measures for the public health and safety. As agent of the central government, he publishes and executes the national laws and ordinances and performs various duties which relate to matters of central concern. The Communal Council is chosen by the same electorate as that which selects the Provincial Council and for the same term. It meets ordinarily twice a year and is presided over by the syndic. It is subject to central control and may be dissolved by the King. Its duties include a large control over the communal civil service, the care and management of communal property and institutions, and the administration of a large number of purely local matters. In each commune is also an organ known as the municipal junta, composed of the syndic and a number of assessors elected by the Communal Council. It corresponds to the deputation in the province, i.e., it conducts the affairs of the commune when the Council is not in session.

The judicial system of Italy, like the administrative system, is modeled largely on that of France. The lowest judicial functionaries are the consigliatori, one of whom is appointed by the King for each commune. He serves for three years and without pay. His jurisdiction extends to civil actions in which only a small amount is involved. Above this officer is the pretor, whose territorial jurisdiction is the mandamento, a district comprising several communes. His competence in civil matters extends, among others, to all actions in which the amount involved does not exceed 1500 lire, and he has an appellate jurisdiction over the decisions of the consigliatore. In criminal matters his jurisdiction extends to all misdemeanors and crimes punishable by imprisonment for a period not exceeding three months, or banishment not exceeding one year, or by fine not exceeding $200. Above the Court of the Pretor is the Civil and Correctional Tribunal, which is divided into chambers, one of which sits in each of the most important cities of Italy. Its jurisdiction in civil matters extends to appeals from the decisions of the pretor and to those civil actions for which neither the pretor nor the consigliatore is competent. Together with a number of men prominent in trade and commerce, it sits as a court for the adjudication of commercial disputes. It is also a criminal court for offenses not cognizable by the pretor and has appellate jurisdiction over appeals from the decisions of the pretor.

There are 20 courts of appeal in Italy, each of which is divided into chambers. Their appellate jurisdiction extends to decisions of the civil and correctional tribunals. In each appellate court district there are one or more courts of assize, composed of a judge of the Court of Appeal and two assessors, and generally a jury of 14 men. The criminal jurisdiction of the Court of Assize extends to crimes punishable by imprisonment for a long period of time, to offenses against the security of the state, and to press offenses.

The highest judicial tribunals in Italy are the courts of cassation, of which there are five—one at Florence, one at Naples, one at Palermo, one at Turin, and one at Rome. Each is composed of a first president, several presidents of sections, and from 8 to 16 judges. Each is divided into two chambers—one civil, the other criminal. Each is the court of last resort within its own district, but, unlike the Supreme Court of the United States, has power only to quash the decisions of the lower courts on account of errors in law and send them back for rehearing. Like all European courts, they have no power to declare statutes null and void on account of their repugnance to the constitution. As in France, the so-called separation of justice from administration exists, and a series of administrative tribunals, modeled after those of France, have been created. The highest of these is the judicial section of the Council of State. A source of danger to the Italian judiciary is its lack of independence as over against the administration. The judges are irremovable after three years of service, but they may be transferred to less desirable judicial stations by the Minister in the "interest of the service." It is claimed that this power has been abused to the detriment of the judicial service.

Colonies. The history of the colonial expansion of Italy is the same as of its military expansion—an attempt to keep abreast with the Great Powers in the most costly and ruinous of activities without having first developed the productive sources at home. The colonial policy has been advocated by Italian statesmen as a means of increasing foreign commerce, because in other countries it has served as an outlet for overflowing industry and trade. The result has been disastrous to the government and country alike. After spending about $75,000,000 on the African possessions Italy has been forced to abandon most of its ambitious schemes. See section *History* in this article.

In September, 1911, after a quarrel with Turkey, Italy invaded Tripoli. Turkey ceded the territory to Italy by the Treaty of Ouchy, signed Oct. 18, 1912. The area of the territory annexed is estimated at about 406,000 square miles; native pop., 523,176 (census of 1911). According to a recent statement by the Minister of the Treasury, the Libyan campaign, the occupation of the Ægean Islands, and precautionary measures cost the government $222,000,000 up to Dec. 31, 1913. The other Italian possessions include the Colony of Eritrea on the Red Sea, with an area of about 45,800 square miles and a population of about 450,000; and Italian Somaliland, with an area of 139,000 square miles and a population of 400,000. The government has to contribute more than $1,000,000 annually to cover the deficit of the administration.

Money, Weights, and Measures. As a member of the Latin Union, Italy has the same monetary system as France (so far as the standard of money and coinage is concerned, not the method of issuing paper money). The amount of fractional silver coinage to which Italy is entitled under the provisions of the Union has been fixed at about $46,000,000. The coins are the same in value, size, and fineness as those in France, except that the name "lira" (pl. lire) is substituted for "franc," and "centesimo" for "centime." The metric system applies to all weights and measures.

Population. Italy ranks sixth among the countries of Europe with respect to population, coming after France. The following table shows the area and population by provinces in 1881, 1901, 1911, and estimates for 1913:

PROVINCES AND COMPARTIMENTI	Area in square miles	Population 1881	Population 1911	Population 1913 (est.)
Alessandria	1,964	729,710	807,696	809,212
Cuneo	2,869	635,400	646,719	654,500
Novara	2,553	675,926	756,326	759,630
Turin	3,952	1,029,214	1,213,709	1,229,169
Piedmont	11,338	3,070,250	3,424,450	3,452,511
Genoa	1,582	760,122	1,050,052	1,070,940
Porto Maurizio	452	132,251	147,179	147,335
Liguria	2,034	892,373	1,197,231	1,218,275
Bergamo	1,065	390,775	511,237	523,911
Brescia	1,807	471,568	596,411	608,229
Como	1,105	515,050	616,212	625,968
Cremona	678	302,138	348,749	350,419
Mantua	903	295,728	349,048	353,277
Milan	1,221	1,114,991	1,726,548	1,779,523
Pavia	1,288	469,831	512,340	512,803
Sondrio	1,232	120,534	129,928	131,929
Lombardy	9,299	3,680,615	4,790,473	4,886,059
Ancona	748	267,338	319,709	325,887
Ascoli Piceno	796	209,185	253,635	256,787
Macerata	1,087	239,713	258,393	261,640
Pesaro e Urbino	1,118	223,043	261,516	264,233
Marches	3,749	939,279	1,093,253	1,108,547
Umbria, Prov. Perugia	3,748	572,060	686,596	696,612
Latium, Prov. Rome	4,663	903,472	1,302,423	1,338,382
Aquila degli Abruzzi	2,484	353,027	407,005	413,283
Campobasso	1,691	365,434	349,618	351,445
Chieti	1,138	343,948	366,593	372,083
Teramo	1,067	254,806	307,490	312,040
Abruzzi e Molise	6,380	1,317,215	1,430,706	1,448,851
Avellino	1,172	392,619	396,581	401,504
Benevento	818	238,425	254,726	258,894
Caserta	2,033	714,131	791,616	797,182
Naples	350	1,001,245	1,310,785	1,324,871
Salerno	1,916	550,157	558,282	560,555
Campania	6,289	2,896,577	3,311,990	3,343,006
Bari delle Puglie	2,065	679,499	891,624	908,357
Foggia	2,688	356,267	467,020	473,324
Lecce	2,623	553,298	771,507	789,318
Apulia	7,376	1,589.064	2,130,151	2,170,999
Basilicata, Prov. Potenza	3,845	524,504	474,021	480,571
Belluno	1,293	174,140	192,793	197,645
Padua	827	397,762	519,358	532,130
Rovigo	685	217,700	257,723	261,441
Treviso	956	375,704	491,166	505,407
Udine	2,541	501,745	628,081	648,825
Venezia	934	356,708	466,752	478,035
Verona	1,186	394,065	475,049	483,645
Vicenza	1,056	396,349	496,438	504,749
Venetia	9,478	2,814,173	3,527,360	3,611,877
Bologna	1,448	457,474	577,729	588,888
Ferrarra	1,012	230,807	307,924	315,028
Forli	725	251,110	301,408	307,870
Modena	1,003	279,254	353,051	361,669
Parma	1,250	267,306	326,163	332,341
Piacenza	954	226,717	256,233	260,611
Ravenna	715	225,764	248,356	252,262
Reggio nell' Emilia	885	244,959	310,337	316,728
Emilia	7,992	2,183,391	2,681,201	2,735,398
Arezzo	1,273	238,744	283,663	286,405
Florence	2,265	790,776	999,423	1,011,848
Grosseto	1,738	114,295	146,634	150,905
Livorno	133	121,612	135,765	137,547
Lucca	558	284,484	333,011	338,369
Massa e Carrara	687	169,469	212,430	219,449
Pisa	1,179	283,563	342,250	346,107
Siena	1,471	205,926	241,530	243,222
Tuscany	9,304	2,208.869	2,694,706	2,733,852
Catanzaro	2,030	433,975	483,235	493,565
Cosenza	2,568	451,185	474,001	480,723
Reggio di Calabria	1,221	372,723	444,915	456,066
Calabria	5,819	1,257,883	1,402,151	1,430,354
Caltanissetta	1,263	266,379	342,557	347,517
Catania	1,917	563,457	789,147	802,451
Girgenti	1,172	312,487	393,804	400,903
Messina	1,246	460,924	517,248	525,717
Palermo	1,948	699,151	795,631	795,007
Syracuse	1,442	341,526	476,765	487,704
Trapani	948	283,977	357,106	361,190
Sicily	9,936	2,927,901	3,672,258	3,720,489
Cagliari	5,186	420,635	520,213	527,109
Sassari	4,123	261,367	332,194	336,106
Sardinia	9,309	682,002	852,407	863,215
Kingdom of Italy	110,688	28,459,628	34,671,377	35,238,997

The following list shows the increase of population, during the nineteenth century, within the present territory of the kingdom:

1816	18,383,000
1848	23,618,000
1862	25,000,000
1872	26,801,154
1882	28,459,628
1901	32,475,253
1911	34,671,377

Thus, there has been an increase of 6,211,749 people, or over 21.8 per cent, in 29 years. With respect to density of population, 318.8 people per square mile in 1913, Italy ranks third among the countries of continental Europe, coming after Belgium and the Netherlands. In general, the northern portion of Italy, extending as far south as Florence, is more densely populated than the remaining portions. The population is remarkably homogeneous, the number of distinctly non-Italian inhabitants being small and concentrated in a few districts; as, e.g., the 80,000 people of French origin in the Province of Turin, 90,000 Albanians in Sicily and southern Italy, 30,000 Greeks in Calabria and on the Adriatic coast, 30,000 Slavs in northeast Italy in the vicinity of the Austrian frontier, 11,500 Germans living mostly in the north, and some 10,000 Spanish in Sardinia.

The number of foreigners residing temporarily in Italy is very small—about 61,600 in 1901. There is a slight excess of males over females in Italy.

The following table includes all towns having a population of over 100,000 in 1911:

	1901	1911
Naples	564,000	678,000
Milan	491,000	599,000
Rome	463,000	542,000
Turin	336,000	427,000
Palermo	310,000	341,000
Genoa	235,000	272,000
Florence	205,000	233,000
Catania	150,000	211,000
Bologna	152,000	173,000
Venice	152,000	161,000
Messina	150,000	127,000
Leghorn	98,000	105,000
Bari	77,000	104,000

Emigration. The unsatisfactory condition of public affairs is responsible for the enormous tide of emigration. More than 5,500,000 Italian emigrants are living in foreign countries, and their number increases from year to year by hundreds of thousands. The growth of emigration in the last four decades was as follows:

1876	108,771
1880	119,901
1885	157,193
1891	293,631
1896	307,482
1900	352,782
1905	726,331
1910	651,475
1911	538,844
1912	711,446

It will be seen that the emigration increased more than fivefold in the period indicated. As the conditions responsible for this exodus from the country do not seem to improve much, there are no reasons to expect any decline of emigration in the near future. The region contributing most to the emigration is the less productive and more poorly developed southern portion of the peninsula from Naples southward, and the emigrants are chiefly peasants or representatives of other lower classes. The Province of Genoa contributes more than any other province in the north to the stream of emigration. The country most vitally interested in this question is the United States. As late as 1888 less than 12 per cent of all the Italian emigrants went to the United States, while more than 33 per cent went to Brazil, and about 23 per cent to Argentina, Uruguay, and Paraguay. In 1910 the proportion was reversed, the number of emigrants to the United States, Brazil, and Argentina being 263,000, 19,000, and 105,000, or 40.3 and 16 per cent respectively. By a ministerial Decree of July 30, 1911, immigration to Argentina was suspended until Aug. 24, 1912. The result was that in 1911 only 32,719 emigrants, or 6.13 per cent of the total, went to Argentina. About four-tenths go to European countries, especially France, Switzerland, Austria, and Germany. The majority of these ultimately return home, and the remainder finally embark for America.

Births, Deaths, and Marriages. The birthrate of Italy, although fully up to the normal, has been slowly declining. While it annually exceeded 37 per 1000 inhabitants prior to the last decade of the nineteenth century, in 1911 it was only 31.54. On the other hand, the death rate has declined much more rapidly, having decreased from 28.1 per 1000 inhabitants in 1887 to 21.42 in 1911, the Italian government justly priding itself on the sanitary improvements which have made such results possible. The excess of births over deaths, which was only 7.19 per 1000 inhabitants in 1872, increased to 10.12 in 39 years.

Religion. The great bulk of the inhabitants of Italy belong to the Roman Catholic church. Especial prominence attaches to the church in Italy from the fact that the seat of the central administration of the church is in Rome. The welfare and harmony of the church, however, suffered greatly through the bitter contention that arose over the question of temporal power of the Pope and the possession of property by religious orders. There is still a Clerical party, the influential portion of which consists of the clergy, who would have the temporal power of the church reëstablished. Pius IX refused to recognize the validity of the claims of the Italian government to the possession of the papal territories, and always insisted upon the rights of the papacy to the States of the Church. Leo XIII steadily pursued the same course, and declined the consideration of any modus vivendi which did not admit the papacy's rights to the temporal power. Pius X followed, and Benedict XV is following, the same policy. This unyielding attitude against compromise has considerably hampered the political work of the government in internal affairs and weakened it in its policy against the alarming aggressiveness of the Socialist party. The great majority of the upper classes are strongly opposed to the realization of the claims of the Clerical party. It is probable that the antipathy to the political ambition of the Clericals is largely responsible for the indifference which the majority of the better classes show towards all religious principles and for the widespread prevalence of free thought. The clergy, however, have a very considerable following from the ranks of the ignorant classes of the population. Miracles and mysteries play an important part in the worship of the lower classes, particularly in south Italy. In 1866 a law suppressing all religious houses was passed, applicable to the entire kingdom. Their property was sold by the state, the greater part of the proceeds being turned into an ecclesiastical fund for the support of public worship, though a part of the proceeds is granted as pensions to some members of the suppressed religious institutions. In 1899 there were still over 13,000 persons receiving pension funds. Although their property was taken from them, the religious orders still have a large membership. The last census figures available (1901) return 65,595 Protestants and 35,617 Jews. Over a third of the Protestants were Waldenses. They are strongest in Piedmont. The Greek Orthodox church also has a small representation in Italy.

Social Betterment. The agricultural class, forming the greater part of the population, during the last decades of the nineteenth century suffered from all the ills that come in the wake of poor soil, antiquated methods of cultivation, defective land system, burdensome taxation, and want of capital. Since that time much has been done to improve conditions. After long and persevering efforts on the part of the people, strikes, and food riots, laws have been passed for the reclaiming of land by irrigation, for afforestation, and for the draining of the swampy district, in the endeavor to stamp out malaria. The most important work, however, has been done by the village banks (see *Banking*) and the coöperative agrarian societies. The former provide the capital, often on credit; the latter have an extensive and varied programme. They supply the people with modern implements, seed, and manure almost at cost price; they encourage the founding of agricultural schools and especially of traveling agricultural professorships. Emigration to North and South America has had a good effect on labor conditions in rural districts. By lessening competition it has raised the wage; and, better still, emigrants returning from America have brought with them new ideas and a higher standard of living, together with increased demands.

The position of the industrial worker in Italy is worse than that in any other western European country, except Spain. But he has raised himself considerably by economic organization and political action. The unit of activity is not so much the trade-union, which, however, is growing to occupy a more important place, as the chambers of labor. The chambers are the foci of labor organizations and are usually subsidized by the municipalities. In 1898 most of them were dissolved by the conservative government. They were soon reëstablished, however, stronger and more numerous than ever. They fight on all occasions in the interest of the workingmen. In this way wages have been increased and hours have been shortened. Labor legislation is still backward, though much has been done through the efforts of the Socialists and Radicals in Parliament.

Laws have been passed forbidding children under 12 to be employed in factory or workshop; boys under 13 and women are not allowed to work underground or in unhealthy and dangerous trades; night work for women and boys under 15 is strictly forbidden. Women are required to abstain from work for one month after childbirth and receive maintenance during abstention. Besides laws of this type there has been constant extension of accident-insurance funds and old-age and invalidity pensions. The laws are excellent, but, as there is very little provision for enforcing them, they are to a great degree violated and evaded.

Italy now needs more thorough economic organization, legislation putting less of a burden of taxation upon the people, more labor legislation, and especially more rigid enforcement of laws, to come up to the level of the other European countries.

Charities. The extreme poverty of the population in Italy has given occasion for much activity in order to prevent distress. Formerly the income derived from the property of the religious orders was liberally, though not always wisely, spent for charitable purposes. Indeed, the belief that the sort of charity which the religious orders dispensed tended to foster pauperism was one of the motives which led to the selling of their possessions. The responsibility for the care of the poor now falls more definitely upon the state, which has become very active not only in the usual sphere of charitable endeavor, but also in the matter of improving the industrial and social conditions. (See below.) A large part of the government's annual expenditure for charitable purposes is by grants to charitable institutions which have permanent charitable endowments. In the course of years a large number of these have been established, the investigation of 1900 showing 27,078, with an aggregate capital of about $425,000,000. Large additions have been annually made since that time. The sum at their disposal that year amounted to $23,308,000. The charitable institutions include different kinds of hospitals and asylums, almshouses, workhouses, etc. Outdoor relief is also extensive and includes assistance in food or money, medical attention, and other objects, one of the most important being the giving of marriage portions. The Minister of the Interior is at the head of the charitable administrative system, the larger institutions being directly under charge of the provincial governments and the smaller ones in charge of the communes.

Education. Italy compares very unfavorably with north European countries in respect to the general diffusion of education. Since the nation is overburdened with debt and is lacking in national wealth, the educational system has not had the financial support necessary to its proper development. It would have been difficult to establish a high educational standard even had the government not been financially handicapped. It required much effort and time to do away with the extremes of illiteracy existing in some of the provinces when the present kingdom was established. In whole regions two-thirds of the population were illiterate, and in Reggio di Calabria and Catania the illiterates amounted to 93 per cent of the total population. A better condition generally prevailed throughout the north of Italy. The government, desirous of improving the educational status, made elementary education free and in 1877 passed a law making education compulsory between the ages of six and nine years. This has had a very beneficial influence, although, excepting in the northern provinces of Piedmont and Lombardy, the law has not been strictly enforced. Attendance is much the greatest in the winter months, when the schoolhouses are often overcrowded. The reduction of illiteracy has been aided by the introduction of the policy of giving elementary instruction to illiterate conscripts. The percentage of illiterates married decreased for males from 57.73 in 1871 to 24.8 in 1910, and for females from 76.73 in 1871 to 36.8 in 1910. In Basilicata the male illiterates at the time of marriage were still in 1910 over one-half of the total.

The national scheme of education comprehends the entire scope of education, including kindergarten, primary, secondary, technical, and higher instruction. In 1907–08 there were 343,563 children in attendance at kindergartens. Private societies and citizens, besides the communes, support the kindergartens. The primary course of instruction is divided into two grades. The first grade corresponds to the compulsory period, or the first three years of a child's school life. The second grade is a supplementary course of two years, but comparatively few pupils continue in this grade, the enrollment being less than a tenth of that in the lower grade. The attendance at the public primary schools in 1907–08 was 3,002,168, and at the private schools of the same rank 148,081. The private schools are required to follow the same programme as do the state schools. Many of the communes have established night or Sunday schools for the special benefit of children who do not continue into the second grade of the primary course and also for the benefit of adults. The enrollment at these schools in 1907–08 was 182,373. A still higher grade of schools has been established for the benefit of girls who wish to prepare for normal schools or for a practical career, the instruction including bookkeeping and technical branches. The attendance at these in 1910–11 was 19,678.

The elementary school buildings are generally throughout the rural districts of a very inferior and inadequate kind. Often rooms are rented for school purposes, and their selection is not infrequently made by officers who are incompetent or who subserve their personal interest. In many cities, however, the buildings and their equipment are of the most approved type. In 1877 religion was eliminated from the state schools. Religious instruction is only given when demanded by parents of the pupils. The private schools are generally in charge of religious orders. In the last years of the nineteenth century much progress was made in the introduction of agricultural courses into the elementary school system. The communes bear the main burden of elementary education, although the state assists and to a small extent the provinces assist also. The state, provinces, and communes share in varying proportions in the support of other branches of education, the local Chamber of Commerce also sometimes aiding in the support of special schools. A large number of the secondary institutions are supported by religious denominations.

The attention given to higher education is remarkable, considering the backward condition of elementary education. In the last quarter of the nineteenth century the gain in graduates from the 21 Italian universities was about seven times the corresponding rate of increase of the Italian population. This result is largely due to the fact that public offices must be entered by way of the universities. Recently, however, the attendance has fallen off somewhat. The state maintains 17 universities, as follows: Naples, Turin, Rome, Padua, Bologna, Palermo, Genoa, Pavia, Pisa, Catania, Modena, Messina, Parma, Cagliari, Siena, Sassari, Macerata, which, together with the four free universities in Perugia, Camerino, Urbino, and Ferrara, had a total enrollment of 21,436 in 1911–12. The first eight of these exceeded an enrollment of 1000 each, and Naples had 4281. Besides the foregoing, there are separate university courses. Italy is known internationally for its art institutions, of which there were 13 government and 13 nongovernment in 1910–11, with aggregate enrollments of 2566 and 1162 respectively. There are five government and a number of private music conservatories. There are also a number of commercial, agricultural, and other industrial schools of academic rank.

For the training of teachers there are about 130 normal schools, the greater part of them being under the control of the government. The attendance at these in 1910–11 was 37,912, nearly all of it female. Compared with American or even north European standards, the teachers are underpaid, but their salaries do not compare unfavorably with those received by other classes of the Italian population. Male teachers of a superior degree receive from $200 to $264 a year in the cities, while female teachers of an inferior degree receive from $112 to $130 in the country. The provision of the law that calls for an increase in salary every six years of uninterrupted service is evaded by dismissing teachers before the expiration of that period. Provisions are made for the pensioning of teachers, both the communes and the teachers' salaries being levied upon for the pension fund.

The secondary educational system is divided into two groups—the classical and the technical, the latter having greatly increased in popularity during recent years. There are two kinds of classical schools—the ginnasi and the licei, the former being a five years' course and receiving pupils of the age period 10 or 11 to 15 or 16. The latter is only a three years' course. A few of the licei have recently reformed their curriculum by substituting mathematics and a modern language at the expense of Greek and the sciences. In 1910–11 there were 291 ginnasi, with 38,053 pupils, and 159 licei, with 14,342. The technical instruction is given at technical schools, of which there were 831 in 1910–11, with 82,406 pupils, and at technical institutes, of which there were 77 in the same year, with an attendance of 20,712. See MONTESSORI.

Ethnology. Of the Paleolithic epochs of culture stages of Europe there are few relics in Italy, yet the northern slopes of the Apennines are said to be rich in chipped implements of the *coups de poing* type. Scrapers also abound, and leaf-shaped objects of Solutrian type, but little of later Paleolithic forms. In places favorable to such life cave dwelling is not without its witnesses. The stone workers of the earliest human occupation of Italy were followed in the Neolithic period by dolichocephalic pottery makers and builders of pile dwellings on the lakes of the northern borderland, and by mound builders in the Po valley, who on the marshy lowlands built tumuli, called terramare (q.v.), with level tops, and on them erected dwellings and villages, which were protected by ditches. The germ of Italian culture lay in this epoch. The peoples were many, though in the regions separated by the Po they belonged to only two races. Industrialism had taken the place of savagery. The polished axe, the scraper, weights, and spindles of terra cotta, coarse and fine pottery, slate ornamented with etchings, toilet articles and domestic utensils of bone and antler, linen fabrics, acorns, hazelnuts, and seeds of flax, wheat, barley, poppies, and apples, all show that a mixed people then existed. The most ancient peoples of Italy known to the historian belonged to a dolichocephalic race. They may be classed in the Mediterranean species and called Ligurians. They were akin to the Iberians of Spain and the Pelasgians of Greece, a colony of whom, greatly modified by local mixture, became Etruscans. Towards the close of the Neolithic period there came into the north of Italy a brachycephalic people who brought with them copper and occupied most of the Po valley, founding there the Umbrian dominion. This short-headed race modified the biological characters, the customs, and the speech of this northern region. Thus arose a sharp division of the peninsula into two distinct ethnic areas—that of the broad-headed Alpine or Celtic type of central Europe, north of the Apennines, and the true long-headed Mediterranean or Ligurian type in the south. Later on appeared the tall, blond race from what is Germany and from the regions farther east, Cimbri, Goths, Ostrogoths, Visigoths, Saxons, and Lombards. These conquerors were long-headed also, like the Pelasgians. They did not profoundly modify the physical characters of the population. The skulls of the peoples along the Po are varied from place to place. Biologically the two divisions of Italy exist as they did before the Teutonic invasions. Venetians are 1.666 meters or 65.5 inches in stature, and the proportion of head width to head length among the Piedmontese is 0.86. In the other ethnological division of Italy Sardinian soldiers are only 1.619 meters or 63.68 inches in stature, and the ratio of head width to head length is 0.77.

History. For the history of Italy down into the fifth century A.D., see ROME, *History*. When Metternich, in 1845, said that Italy "represents simply a group of independent states, united under the same geographical term," he was describing a state of affairs which had existed ever since the downfall of the Roman Empire in the fifth century. This lack of unity makes it almost impossible to present the history of Italy under one head, but necessitates a study of the separate states. (See especially the articles on VENICE; FLORENCE; GENOA; MILAN; LOMBARDY; SAVOY; TUSCANY; NAPLES; ROME; SICILY; PAPAL STATES.) Through the repeated invasions of the barbarians into Italy during the fifth century (see especially ALARIC; ATTILA; GOTHS; HUNS) many portions of the country had been depopulated and government had become very weak. The old free population had long since disappeared, and the land was chiefly in the hands of powerful nobles, who were able to maintain bands of retainers by means of which they could protect themselves against marauders. Finally in 476 the last independent Emperor of the West, Romulus Augustulus, was dethroned by Odoacer (q.v.), a chief of the German tribe of the Heruli. This event is usually taken as marking the end of the Roman Empire and the beginning of the Middle Ages. As a matter of fact, there was no abrupt transition; for Odoacer and his Germanic successors continued the old constitution, which, however, had ceased to be effective for some time before 476 and gradually disappeared, though for centuries it was invoked by all rulers of Italy. Odoacer did not enjoy his crown long, but was treacherously murdered in 493 by Theodoric the Great (q.v.), under whose leadership the Ostrogoths had invaded Italy. For the last time in many centuries Italy was prosperous; for Theodoric was just and wise, and the natives were treated mildly, being judged equitably and allowed to retain to a large extent their property. But the Italians, who were largely Catholics, were discontented under their Arian masters. The result was that, forgetting or underestimating Byzantine despotism, they welcomed the attempts of Belisarius (q.v.) and Narses (q.v.), the generals of the Byzantine Emperor Justinian, to drive out the barbarians after the death of Theodoric, in 526. In 552 the last of the Gothic kings, Teias or Teja, fell in the terrific battle at Mount Vesuvius, and the remainder of the Goths disappeared among the Italians.

The Byzantine sway was of short duration; for after the recall of the capable Narses in 565, the Lombards (q.v.), a Germanic people, invaded Italy, according to the account of Paulus Diaconus (q.v.), called in by Narses himself in revenge for his recall. Their King was Alboin, who made Pavia his capital, and from that city as a starting point expeditions were sent in all directions, so that soon nothing was left to the Byzantine Empire except the south and the Exarchate of Ravenna. After the death of Alboin, in 573, the Lombards for a time had no King, but separate bands united under various leaders, known as "duces." They were Arians, as the Goths had been before them, and hence there was continuous strife between them and the native Italians, which increased as the popes became more powerful and the real rulers of Rome. Finally a new King, Agilulf, who ruled from 590 to 616, became a convert to Catholicism, and for some time comparative harmony prevailed. But the Lombards from political necessity were driven to seek possession of the city of Rome, and thereupon the popes called in the Franks to aid them. These under the vigorous leadership of Pepin (q.v.) and Charles the Great conquered the Lombards, and finally in 774 Desiderius, the last King of the Lombards, was sent to die in a monastery, and Charles the Great had himself crowned with the Iron Crown (q.v.). This proved to be little more than a change of rulers, for, as generally in the Middle Ages, the laws of the victors were not imposed upon the conquered. Out of gratitude for the royal title which the Pope had bestowed on him after the deposition of the last of the Merovingian kings, Pepin granted to the holy see the possession of a strip of territory in central Italy, comprising the Exarchate of Ravenna, the March of Ancona, and the Romagna, the former two conquered from the Lombards. This donation of Pepin (q.v.), later confirmed by the donation of Charles the Great, was momentous for the history of Italy in that it marked the beginning of the temporal rule of the popes and introduced into Italy one of the most powerful factors of national activity. On Christmas Day, 800, Charles the Great was crowned Emperor by Pope Leo III, and for centuries the history of Italy turned upon the conflict and interrelation between the two great powers which disputed with each other the primacy in mediæval life, the empire and the papacy. By the Treaty of Verdun (843), in which the Frankish realm was partitioned between the grandsons of Charles the Great, Italy was included in the share given to Lothair. During the years of confusion that followed, the Saracens overran south Italy and even threatened Rome. The history of Italy for many years is nothing but the rise of one petty king after another, many of them aspiring to the Imperial title. Among these may be mentioned Guido of Spoleto, Berengar of Friuli, and Hugo of Provence. With them the papacy intrigued and plotted, for the successor of Peter was now the puppet of different factions in Rome.

The period of anárchy ended in 962, when Otho the Great (q.v.), after obtaining possession of north Italy and the Lombard crown, was crowned Emperor. This marked the establishment of the Holy Roman Empire of the German Nation (see HOLY ROMAN EMPIRE), and until the end of the Middle Ages the Emperor theoretically ruled over Italy, though the Imperial authority was completely set aside by the beginning of the fourteenth century. For a long time the emperors came to Rome to be crowned by the Pope, and until that had been done their title was not considered to be complete. Meanwhile the south of Italy was still in the possession of the Byzantines and Lombards, whom the German emperors were unable to oust, until finally in the eleventh century they were driven out by the Normans, who in 1127 united their conquests in Italy with Sicily, which they had wrested from the Saracens. (See SARACENS; NORMANS; GUISCARD, ROBERT.) In the time of the Emperor Henry IV (1056–1106) the papacy had become strong and powerful again, and the great investiture struggle broke out, the papacy finding an indomitable champion in Gregory VII. See INVESTITURE.

Simultaneously with the increasing power of the popes a great barrier to the continued rule of the Germans was being erected in the rising city states. In Italy the feudal system had never attained the high development so characteristic of France and Germany, which was due to a great extent to the survival of Roman traditions and the many cities in Italy, for feudalism was chiefly rural, not urban. The cities of Lombardy defied the power of the Emperor Frederick Barbarossa, of the house of Hohenstaufen, who waged bloody wars with them to no purpose. In 1167 the Lombard League (q.v.) was formed. In 1176 Frederick was vanquished at Legnano, and in 1183, in the Peace of Constance, the cities secured the recognition of their liberties. A last attempt to crush both the papacy and its allies was made by Frederick II, the last great ruler of the house of Hohenstaufen (1215–50); but, though he controlled Naples and Sicily, as well as the Empire, even his great ability was unable to change the state of affairs. Italy itself was rent by the struggles between the opponents and the partisans of Imperial rule, known respectively as Guelphs and Ghibellines (q.v.), names which continued to be the designation of fiercely contending parties long after the emperors had lost their hold on the country.

In the second half of the thirteenth century a new foreign power came to play an important rôle in Italian affairs. Charles of Anjou, brother of Louis IX of France, summoned by the Pope to aid him against the Hohenstaufen, undertook the conquest of the Kingdom of Sicily and Naples (The Two Sicilies), and overthrew Manfred, the son of Frederick II, in 1266. Conradin, the last of the Hohenstaufen, was defeated in an attempt to recover the Kingdom in 1267 and put to death. But in 1282 (see SICILIAN VESPERS) Sicily rose against the French and placed itself under the power of Aragon.

In the north the cities, having secured independence from the central authority, entered into contests with the nobles, who claimed authority over them. Gradually the various nobles were defeated, compelled to abandon their castles in the country, and to live in the cities. By commerce the cities had grown very wealthy and had established oligarchical governments, which were tending to become democratic. Venice by her share in the Fourth Crusade had secured extensive possessions in the East. (See BYZANTINE EMPIRE; DANDOLO.) Pisa, Genoa, Milan, and Florence had acquired great power. In 1278 the Emperor Rudolph of Hapsburg recognized the Papal States, which included Emilia, Romagna, the March of Ancona, the Patrimony of St. Peter, and the Campagna of Rome. In 1284 the naval power of Pisa was crippled by Genoa. Before this Genoa had engaged in a fierce struggle for ascendancy with her rival, Venice, which finally ended in favor of Venice towards the close of the next century. In every city of north and central Italy the population was divided into Guelphs and Ghibellines. In a general way the former may be said to have represented the progressive party; the latter, the conservative. In the cities civil strife was incessant, and the triumph of either party frequently resulted in the expulsion of the hostile faction from the city. Often the exiles attempted to regain power with the aid of other cities, and city warred against city, producing throughout the later Middle Ages a shifting succession of alliances, conquests, and temporary truces. This condition of affairs was inimical to commerce and manufacturing, which were the chief interests of the citizens in the north. In the cities the podestà (q.v.), who had been created as an arbitrator between the different parties, had proved inefficient and now became mainly a judicial officer. His place as head of the city was taken by a "captain of the people," representing the dominant party. As military skill was essential in this position, it was held usually by a noble. The people, desirous of peace, acquiesced in the establishment of a strong power. Hence there arose in almost every city a "despot," or absolute ruler, an office which in many cases came to be hereditary in some noble family—with the Scalas at Verona, the house of Este at Ferrara, the Malatestas at Rimini, the Visconti and later the Sforzas at Milan. This period has been called fittingly "the age of the despots." Under their rule the arts prospered, literature flourished, life became more luxurious, wealth greater. But the people, who had fought so valiantly in the past, became unwarlike, and the cities placed their reliance in mercenary troops. (See CONDOTTIERI.) Gradually the smaller cities passed under the influence of the stronger states. By the middle of the fifteenth century Italy had reached a position of great prosperity and comparative tranquillity. She was in the van of European countries in all that pertained to culture, having led the way in the great revival of the arts and letters. (See RENAISSANCE.) Tuscany, which had produced Dante and Giotto, was preëminent in this revival. Amid all this splendor began a terrible period of foreign aggression in 1494.

Modern History. From the close of the Middle Ages until the nineteenth century there is no history of Italy as a united nation, but only of the different cities and states which composed it, their rivalries and their combinations with foreign powers. Chief among these states were the Duchy of Milan (which came to an end in 1535), and the republics of Florence, Genoa, and Venice in the north; the States of the Church, stretching, a bar to political unity, across the middle of the peninsula; and the Kingdom of Naples in the south. In addition to these more important political divisions there were many minor courts distinguished throughout Europe for their magnificence and intellectual brilliance. Some families, of whom the Medici of Florence are the most notable example, having amassed great wealth in banking or commerce, rose to the highest power in church and state. But at the close of the fifteenth century Italy entered an age of invasion in which she became the scene of fierce wars waged by France, Spain, Austria, and the Italian states and princes, culminating in the ascendancy of the Spanish and Austrian Hapsburgs. The discovery of America, which destroyed the commercial supremacy of Venice and therewith her political power; the fall of Granada, which increased the influence of Spain by giving it a free hand; the death of Lorenzo de' Medici in Florence—hastened this catastrophe. In 1494 Charles VIII of France undertook to conquer the Kingdom of Naples, then misruled by the house of Aragon. He was tempted by Ludovico Sforza, the Milanese usurper, and by the Florentines, who were ripe for rebellion against the tyranny of the Medici. He invaded Italy, made a treaty with Florence, which expelled the Medici, brought the Pope to submission, and marched on Naples, which was taken. Charles was, however, forced by a league formed against him by Venice, Spain, Milan, the Emperor Maximilian, and the Pope, to retire from Naples and fight his way out of Italy (1495–96). This French invasion had an importance transcending its political results in the dissemination of the Italian culture over the rest of Europe. Michelet has described it as "the revelation of Italy to the nations of the North." Louis XII, the successor of Charles VIII, assumed the titles of King of Naples and Duke of Milan and entered upon a policy intended to support these pretensions. Allying himself with Venice, Louis invaded the territory of Milan in 1499 and was soon master of it. In 1501 a partition treaty was arranged between Louis and Ferdinand of Spain, by which the latter was to have Calabria and Apulia, with the title of Duke, and the King of France was to have the remainder of the Neapolitan Kingdom, with the title of King of Naples and Jerusalem. This treaty, which was on the part of Spain an act of the most cold-blooded treachery towards an ally, was immediately carried out by force of arms. Quarrels soon arose between the two allies, and in 1502 France and Spain were again at war on Italian soil. Through the generalship of Gonsalvo de Córdoba (q.v.), the French were driven out and made a disastrous retreat to France. (See CERIGNOLA; GARIGLIANO.) But France was soon in the field again in north Italy. In 1508 the League of Cambrai was formed against Venice, which was reduced to great straits by the victory of the French at Agnadello in 1509. But in 1511 the Holy League formed by the militant Pope, Julius II, with Spain and Venice, was arrayed against France, whose forces were driven out of Italy in 1513. Two years later Francis I (q.v.), continuing the policy of his predecessors, reconquered Milan; but it was lost again in 1521, immediately after the outbreak of the great struggle between that monarch and his rival, the Emperor Charles V. Francis I was defeated and captured at Pavia in 1525. In 1527 the forces of the Constable de Bourbon (q.v.) took and sacked Rome, and Pope Clement VII (Giulio de' Medici) became the prisoner of Charles V.

A new invasion of Italy by the French under Lautrec in the same year, with the Florentines, Genoese, and Venetians as allies, was at first attended with success, but in the end resulted disastrously, and in the Peace of Cambrai of 1529 Francis renounced all claims to territory in Italy. He renewed the struggle with Charles V, but the hold of the Hapsburgs on Italy could not be shaken. In 1535, on the extinction of the Sforza dynasty, Charles V took possession of Milan, which became part of the Spanish realm. Naples was governed by Spanish viceroys and remained for over 200 years in the hands of the Spanish Hapsburgs. Of all the free city states of Italy only four survived, of which only Venice and Genoa are worthy of mention. In north Italy the authority of the Hapsburgs (Austria supplanting Spain) was not thrown off until after the middle of the nineteenth century.

The reactionary bigotry of Spain fell heavily upon the whole Italian peninsula. In pursuance of the energetic anti-Hapsburg policy of Richelieu (q.v.), France from 1635 to 1659 waged war against Spain in north Italy, having for its allies Parma, Mantua, and Savoy, which had become an independent state again in 1574 under Emanuel Philibert, who transferred the capital of the duchy to Turin, which thus became the nucleus of the unified Italy of to-day. Under Mazarin's administration France gave some assistance to the Neapolitan revolt, begun under Masaniello and continued under the inefficient leadership of Henry, Duke of Guise. The War of the Spanish Succession (1701–14) and the decline of France at the end of the reign of Louis XIV established the Spanish-Austrian rule in Italy without opposition. Lombardy and Naples passed from Spain to Austria, which also obtained Sardinia, and the house of Savoy received the island of Sicily, wrested from Spain. In 1720 Sicily was exchanged for Sardinia, and the Duke of Savoy took the title of King of Sardinia. The growth in strength and influence of the house of Savoy was the beginning of an efficient national power in Italy. Piedmont became the real centre of life of the new kingdom. In 1734–35 the Bourbons established themselves on the throne of The Two Sicilies, and in 1748 they obtained possession of Parma and Piacenza. The 45 years following the Treaty of Aix-la-Chapelle (1748), which terminated the War of the Austrian Succession, were years of peaceful development in all parts of Italy, which was better governed than it had been for some centuries. Many reforms were introduced, especially in Lombardy, Tuscany, and Sardinia, and although free institutions were not among them the people made economic progress under enlightened despotism. But the spiritual awakening of Europe which preceded the French Revolution had found expression in Italy in men like Alfieri, Beccaria, and other political philosophers. The events following the French Revolution meant the renewal of the struggle between France and Austria for the domination of Italy, but at the same time the revival of the consciousness of strength and unity in the Italian people. In 1792 Savoy and Nice were seized by the French. In 1796–97 the army of Bonaparte swept through north Italy, driving the Austrians before it. Through the Peace of Campo Formio in 1797 Lombardy, part of Venetia, Modena, the Romagna, etc., were constituted into the Cisalpine Republic (later known as the Italian Republic), and the Genoese dominions into the Ligurian Republic. The Venetian Republic, which had existed for 1100 years, was extinguished, and the bulk of its territories handed over to Austria. In 1798 a revolt was organized by French conspirators in Rome, and General Berthier (q.v.) proclaimed the Roman Republic, the Pope, Pius VI, being imprisoned in the French fortress of Valence, where he died the following year. The Neapolitan court, supported by Austria, having undertaken hostilities against the French in Italy in 1798, Naples was taken by the French, Jan. 23, 1799, and the Parthenopean Republic was erected. Piedmont and Tuscany had already been seized by the French. The two southern republics were short-lived. In 1799 the French were expelled from south Italy by the Second Coalition and were forced back in the north. The influence of the French Republic, which had aroused the democratic element in all the Italian states, was ended and was to give place to that of a purely military conqueror, Napoleon, to whom all Italy finally became subject. In 1800 the First Consul, having established his power in France, crossed the Alps and opened his second and most memorable campaign in Italy. The victory of Marengo forced the Austrians to sign an armistice followed by the Peace of Lunéville, 1801, which left Napoleon a free hand for his reorganization of Italy on a military basis. Popular movements which had sprung up under the inspiration of the ideas of the French Revolution were henceforth sharply repressed. Certain reforms were, however, introduced, such as the Code Napoléon. In 1805 Napoleon was crowned with the Iron Crown of Lombardy as King of Italy, this Italy including the northern regions. In 1806 Napoleon took possession of the Kingdom of Naples, which was given to his brother Joseph, and, when the latter became King of Spain in 1808, to Joachim Murat. In 1808 Rome became part of the French Empire. The breakdown of the domination of Italy by Napoleon followed his defeat at Leipzig (1813). The Austrians invaded northern Italy, and an English force occupied Genoa and exhorted the Italians to rise in behalf of their freedom. Murat, having joined the allies, was allowed to retain his throne, but in 1815 he took up arms for Napoleon and was defeated and expelled. The Congress of Vienna led to a restoration of the pre-Napoleonic order with only slight modifications and left Italy at the mercy of Austria and the papacy. The Sardinian Kingdom, augmented by the territory of the Genoese Republic, was returned to the house of Savoy; Austria recovered Lombardy and Venetia (having been stripped of the latter in 1805); Modena was restored to the house of Este (q.v.); the Duchy of Parma was conferred on Maria Louisa of Austria, wife of Napoleon, and Lucca was erected into a duchy for the dispossessed Bourbon dynasty of Parma; the Grand Duchy of Tuscany passed again to the house of Lorraine-Hapsburg; the Bourbon dynasty (which had maintained its rule in Sicily) was restored in the Kingdom of Naples; the tiny Republic of San Marino and the Principality of Monaco retained their independence. The period following the Napoleonic rule and extending to the final unification of Italy in 1870, was characterized by a constantly growing movement for Italian unity and independence, which has been named the Risorgimento.

The dominion of Austria and the rule of autocratic princes, upheld by the Hapsburgs and the Holy Alliance, could not endure in Italy forever. Crushed under an iron despotism, the country was pervaded by a network of secret societies, which kept up a constant agitation for constitutional government. (See CARBONARI.) The French rule had introduced into the country certain liberal and progressive ideas which made their impression upon the people. But the princes, strong in the support of Austria, refused all concessions and by means of an elaborate police system succeeded in checking the progress of liberalism. Risings promoted by army officers took place in Naples (1820) and Piedmont (1821). In Naples Ferdinand I was forced to grant a constitution, but yielded to Metternich at the Congress of Laibach, and in May, 1821, was reëstablished in his despotic sway with the aid of Austrian troops. He now entered upon a course of vindictive persecutions against the Liberals. In Naples Francis I, the son and successor of Ferdinand I, continued the iniquitous policy of his father. The government of the Papal States under Leo XII was oppressive, reactionary, and incapable. Tuscany alone, during the decade of 1820–30, enjoyed a fair measure of freedom and prosperity under its Grand Duke, Leopold II. The July revolution of 1830, which drove the Bourbons from the throne of France, had its echoes in Italy. In 1831 insurrections broke out in Modena and in the Papal States, and in Bologna a congress of representatives from the revolted Papal States, excepting Rome and a few cities in the March of Ancona, adopted a constitution establishing a Republican form of government. Austria promptly intervened, suppressed the revolutionary movement in the dominions of the Pope, and placed a garrison in Bologna. Upon the death of Charles Felix, in 1831, the succession in the Kingdom of Sardinia passed to Charles Albert (q.v.), Prince of Carignan, representative of the younger line of Savoy. There had been in Piedmont already a suggestion of national independence in the agitations of 1820–21. Now, the patriot Giuseppe Mazzini issued an address to the new King, who was known to hold more liberal views than others of his house, calling upon him to become the leader and liberator of Italy. From this time the idea of Italian unification and independence grew in strength and found its hope in the Sardinian monarchy, for it had become apparent that the cause of reaction had its strongest support in Austria, which must be driven from the peninsula by some power strong enough to assume the leadership in Italy. Mazzini at the same time founded the secret political society, Young Italy (q.v.), organized to support the principles of the Carbonari, whose propaganda was Republican, but also Nationalist, as Mazzini realized that freedom was only possible with unity. The impulse to a national uprising was afforded by Pope Pius IX, the first Pope to be elected without the influence of Austria. Immediately after his election in 1846, he entered upon an extensive series of reforms in the Papal States. An amnesty was proclaimed for political offenders, political exiles were permitted to return, the liberty of the press was established, the highest offices were opened to laymen, and a Council of Notables was summoned to initiate new reforms. The example of the Pope was followed by several Italian princes. Reforms were introduced in Lucca and Tuscany, and, above all, in Piedmont, where a great advance was made towards constitutional government (1847). Reform, however, was only preparatory to revolution. In January, 1848, the people of Palermo rose and drove out the Neapolitan garrison, and on February 10 Ferdinand II granted his people a constitution and summoned a separate parliament for Sicily. At the same time Leopold II issued a constitution for Tuscany, although his motive was rather hatred of Austria than sympathy with liberalism, and Pius IX, who had now begun to feel alarmed at the rapidity with which the course of reform was progressing, consented unwillingly to a constitution for the Papal States (March 14, 1848). The revolutionary outbreak in Vienna on March 13, 1848, which drove Metternich from power, was the signal for a rising in Milan (March 18). The Austrian troops, under Radetzky, were driven from the city after a five days' battle with the populace. On March 22 Venice rose under Manin and expelled the Austrians, and on the following day the Republic of St. Mark was reëstablished, with Manin at its head. The rulers of Parma and Modena were forced to flee. In Piedmont there was a clamor for war to drive the Austrians from Italy, and Charles Albert, after long hesitation, decided to mobilize his army and go to the assistance of Lombardy, which he entered March 25, acclaimed as the liberator of Italy. He was joined by 13,000 Neapolitan troops and contingents from Tuscany and Lombardy. On July 25 the Piedmontese suffered an overwhelming defeat at Custozza, and on August 6 Radetzky reëntered

Milan. An armistice was concluded on August 9, by the terms of which Charles Albert was to evacuate Lombardy, Venetia, and the duchies of Parma and Modena. Charles Albert, however, considered it his duty not to abandon the Lombards without making another effort to free them from Austrian domination, and in March, 1849, the armistice was suspended. The Austrians under Radetzky crossed the Ticino, and on March 23 overwhelmed the Piedmontese army at Novara. On the night after the battle Charles Albert abdicated in favor of his son, Victor Emmanuel II. In central and south Italy reaction was triumphant. Pope Pius IX, who saw that the revolutionary movement was fast getting beyond his control, became conservative, but a rising under Mazzini drove him from Rome. On Feb. 5, 1849, the temporal power of the Pope was abolished, and Rome was constituted a republic. In April a French army of 8000 men was dispatched under Marshal Oudinot to suppress the Roman Republic. Oudinot entered Rome in July, in spite of the heroic resistance of Garibaldi, and the papal authority was reëstablished.

The Kingdom of Sardinia, with the liberal constitution which Charles Albert had granted in 1848, remained the only refuge of nationalism and liberalism, though with its diverse and mixed population, alien to the rest of Italy, it was not the most promising ground for the national propaganda. Victor Emmanuel II adhered firmly to the constitution, retained the tricolor flag, the symbol of free Italy, continued the liberty of the press, and encouraged political refugees from the other states to make Piedmont their asylum. The advent of Cavour (q.v.) as head of the ministry (1852) opened a vigorous, aggressive policy, in which the Minister was fully supported by the King. Cavour contrived that Sardinia should enter into an active alliance with England and France, and, after she had rendered them effective assistance in the Crimean War (q.v.), he was able to urge, in the Congress of Paris in 1856, the necessity of the consideration of the condition of Italy as a matter of international concern and to secure an acknowledgment of the claim, in spite of the protest of Austria. He effected an understanding with Napoleon III in a meeting at Plombières in July, 1858, after the attempt of Orsini upon the life of the Emperor had impressed upon him the intensity of the Italian desire for freedom and his own responsibility for intervention, and proceeded to increase the armed strength of Piedmont, acting boldly with a view to bringing on a war with Austria. France came to the aid of Sardinia, and the allied armies won with some difficulty the battles of Magenta (June 4) and Solferino (June 24). All north Italy was preparing to join Sardinia, when Napoleon, through the influence of the Empress Eugénie and the Clerical party in France, deserted his ally and concluded the preliminary Treaty of Villafranca, July 11, 1859. By the Treaty of Zurich, November 10, between France, Austria, and Sardinia, Austria ceded Lombardy, with the exception of Mantua and Peschiera, to France, which was to transfer them to Sardinia. The people of the duchies and the Romagna in a plebiscite (March, 1860) declared for a union with Sardinia. As the price of French assistance, Napoleon exacted the cession of Savoy and Nice, which became a part of France. The situation created by the victories in the cause of national freedom in the north half of Italy invited the great patriot leader Garibaldi to undertake the task of liberating the south. In April, 1860, Palermo rose against Francis II, the successor to the odious Ferdinand II on the throne of The Two Sicilies. On the 6th of May Garibaldi, with about 1000 volunteers, embarked at Genoa, bent on the conquest of Sicily and Naples. After performing miracles of valor Garibaldi succeeded in conquering Sicily and declared himself dictator of Sicily in the name of Victor Emmanuel, "King of Italy." On July 20 he defeated the Neapolitans at Milazzo. Messina, the last stronghold of the Bourbons in Sicily, fell on July 25, and Garibaldi with 5000 men crossed into Italy (August 20–21), meeting with no resistance. On September 7 he entered Naples with a small escort, Francis II having fled to Gaeta, after making a vain attempt to save his throne by the grant of a constitution and the promise of many reforms. The liberator proclaimed the reign of Victor Emmanuel. The Sardinian government had been openly in sympathy with Garibaldi, but had carefully abstained from affording any pretext for the intervention of the foreign Powers. This diplomatic position, however, seemed to be threatened when Garibaldi, not satisfied with conquering The Two Sicilies, prepared to invade the States of the Church. In the meanwhile, the Sicilies, Umbria, and the Marches declared by plebiscite for annexation to Sardinia (October, 1860), and on Feb. 18, 1861, the first Italian Parliament was opened in Turin by Victor Emmanuel. On February 26 the Parliament conferred the title of King of Italy upon Victor Emmanuel, who formally assumed it on March 17.

The death of Cavour, June 6, 1861, at this crucial period, was a heavy loss to the new kingdom. A ministry under Baron Ricasoli had a brief term of office, and was succeeded, March 31, 1862, by the ministry of Rattazzi, whose subserviency to France caused much distrust among the Italian Liberals. The restlessness of Garibaldi, who was impatient of delay in the acquisition of Venetia and Rome, and had even had under consideration for this end a plan for raising a revolt in the Balkans and Hungary, was a grave cause of disquiet for the government, as it was highly important that the new state should not hastily involve itself in a new struggle without outside support. After traveling about Italy, engaging in the organization of "rifle clubs," the irrepressible patriot went to Sicily with the avowed intention of organizing an expedition against Rome. A royal proclamation (dictated by the fear of French intervention) declaring him to be in rebellion did not deter the Sicilians from rallying around the Garibaldian standard, and on Aug. 22, 1862, Sicily was declared in a state of siege, the Liberal clubs were dissolved, and an armed force was dispatched to disperse the volunteers, since the advance of Garibaldi was considered to be a danger to the Monarchist cause. Garibaldi, having landed in Calabria, was met by the Sardinian troops at Aspromonte (August 29), and after a slight engagement, in which he was severely wounded, was forced to surrender. In spite of the temporary check to the conquest of the Papal States, their acquisition was inevitable. In 1865 Florence became the capital of Italy. This was but a step nearer towards Rome. In 1866 Italy allied herself with Prussia against Austria, and although her army was defeated at

Custozza (June 24), and her fleet at Lissa (July 20), she was enabled to participate in the Prussian triumph, and in October Venetia became part of the Kingdom of Italy. (See Seven Weeks' War.) The protection of the papal territory by France alone stood in the way of that completion of unification which required for its fullest expression the establishment of the government in the Eternal City. In 1867 Garibaldi headed a new expedition against the papal territory; but Napoleon III, from motives of policy, refused to permit the extinction of the temporal power of the Pope. A French force defeated the Garibaldians after a severe engagement at Mentana (November 3), and this event destroyed the good feeling which had prevailed between Italy and France since 1859. At last, in 1870, the urgent necessities of the Franco-German War compelled the Emperor Napoleon to withdraw his forces, and once more Italy profited by Prussia's victories. The Italian forces entered the lands of the church on September 11, and on the 20th made their entry into Rome. The Roman people declared for union with Italy in October by 133,000 votes against 1500, and on July 2, 1871, Rome became the capital of United Italy.

The problems of the new state were not simple ones. The task of political organization and consolidation was complicated by the great diversity in economic, cultural, and social conditions between the north and the south. The inhabitants of southern Italy, kept for centuries under a burdensome despotism, showed themselves, on the whole, deficient in training for self-government, which comes more naturally to the Tuscans, Lombards, Piedmontese, and Venetians.

The six years which followed the first Italian Parliament in 1871 witnessed the disintegration of the moderate conservatism which had characterized the policy of Cavour and the other great leaders in the struggle for national unity, and the new monarchy found itself confronted with sectional, social, and ecclesiastical problems of the greatest complexity, in addition to that of securing the newly created nation a voice in the councils of Europe. The ecclesiastical problem was that of a satisfactory settlement between the papacy and the monarchy. The Pope had refused to be reconciled to the arrangement of 1870 whereby the papacy was to be indemnified for the loss of its temporal power by the acquisition of certain privileges and immunities and the receipt from the state of a generous annual income. The papacy has ever since maintained its irreconcilable attitude, and the Pope has considered himself a prisoner in the Vatican, while Catholic citizens have been encouraged to abstain from active participation in political affairs. Within the last 10 years, however, there have been signs of a change of policy upon this last point. See Papacy.

A more complex problem was that of the economic development of the country and the adjustment of the social and sectional difficulties connected therewith. With small resources in coal and other minerals, Italy is, and bids fair to remain, despite all efforts to develop its industries, chiefly an agricultural country, with the exception of the north, where a more intelligent population has taken up the ideas of coöperation, rural banks, and improved methods of cultivation; in the south, and especially in Sicily, agricultural progress has been slow for various reasons. The high percentage of illiteracy, the overtaxation, and the antiquated land system, in which absentee landlordism is combined with a high rate of emigration among the agricultural workers, have united to produce a state of poverty and unemployment which has been aggravated at frequent intervals by disasters of appalling magnitude, volcanic eruptions, landslides, and earthquakes, such as that at Messina in December, 1910, when 170,000 people perished. The large emigration has created peculiar economic conditions: on the one side whole populations are being largely supported by the money sent from relatives in America, on the other side a new form of usury is being created to supply passage money and landing capital to emigrants. The bad economic conditions are accompanied by social and political degeneracy, as exemplified in criminal societies such as the Mafia and Camorra (qq.v.).

With the development of factory industry and the growth of towns a large body of industrial workers was created whose dissatisfaction with their wages and conditions of labor has been the source of constant industrial disturbances. This industrial dissatisfaction combined with the agrarian unrest has found expression in a strong Republican movement, whose growing strength has been shown in frequent strikes and riots both industrial and agrarian, whereas the attitude of the government has grown continually more lenient. A serious agrarian insurrection in Sicily in 1893–94 was suppressed arbitrarily by Crispi. In 1898 riots occurred at the funeral of the Radical leader Cavallotti in Milan and Rome and spread quickly over several provinces. In the so-called "Three Days" at Milan 82 people were killed. The Zanardelli-Giolitti ministry was the first cabinet which abstained from the former attitude of repression and adopted the policy of nonintervention in labor troubles, which was severely strained by the gas strike in Turin in 1902 and a threatened general strike of railway men. The measures taken by the government in the face of a general strike in Rome in 1903 were applauded by the Conservatives and resented by the Extreme Left, which brought about the downfall of the cabinet by starting an agitation against the Czar's proposed visit to Italy and by preferring charges of maladministration in the Navy Department. An attempted reconstruction of the cabinet was met by the Radicals by the appointment of a committee of resistance to declare a general strike and bring about the cabinet's resignation in 1904. The threat was not taken seriously, and the general strike broke out, paralyzing the cities of Milan, Venice, Genoa, and Turin, and disturbing Rome, Florence, and Naples. Railway lines were destroyed, and flags were torn down in denunciation of the monarchy. Giolitti succeeded in mastering the situation by a clever handling of the troops without committing bloodshed. The terrorized middle class, however, joined hands with the clergy, and in the next elections radicalism was completely routed. There have been recurrences of industrial and agrarian disturbance since that time, especially in 1907, 1908, 1910, 1911, and 1914; but, although the social aims of these movements have remained as serious as before, the position of the monarchy seems to be less threatened. Victor Emmanuel I died Jan. 9, 1878, and was succeeded by his son Humbert (Umberto), who inherited his father's courage but not his genial personality and force of character. He was well-meaning and loyal to his coronation oath; but his political outlook was a narrow one, and towards the end of his reign he suffered a small clique of military and reactionary politicians to blind him to the signs of the times. Moving freely among the people in a rather excited period regardless of warning, he was murdered, on July 29, 1900, at Monsa by Angelo Bresci, an Italian anarchist from America. The Prince of Naples, who ascended the throne as Victor Emmanuel II, while steadily opposing any reduction in armaments, has frankly accepted the more enlightened policy that the country demanded and has by this and by the simplicity of his manners and the sincerity of his character improved the somewhat sinister outlook for monarchical rule in Italy.

At the same time a certain amount of democratic progress has been peacefully won by the electoral reforms of 1881 and 1912, which considerably enlarged the electorate. The reform of 1912 granted the franchise to illiterates who had reached the age of 30 and had performed military service. The elections held in 1913 on the basis of this reform indicated a notable movement of the Italian people in the direction of the programmes and the principles of the radical parties—the Liberals having won 16, the Socialists 40, votes.

Other domestic reforms have been the nationalization of railways, attempted somewhat rashly in 1905 and not without some economic maladjustment. More successful in the field of public finance proved Luzzatti's conversion of the debt from 4 to 3½ per cent; but the serious problem of taxation, involving the questions of securing a general relief from overtaxation and a more equitable regional distribution of taxes, the south being at present heavily overtaxed, has proven difficult, owing to the large expenditure for armaments, in which Italy has tried to keep a middle course between the great Powers and the small.

Colonial Policy. The colonial policy of Italy started as a consequence of the forward policy of France in Africa and of England in Egypt. Secured by the Triple Alliance from attack by land and by agreement with Great Britain from attack by sea, the government decided upon a forward policy in Africa. Early in 1885 Beilul and Massowah were occupied by an Italian expedition, but subsequent operations on the mainland evoked protests from King John in Abyssinia. In the anarchy that followed the death of the latter, in 1889, one of the Abyssinian pretenders was promised Italian aid against his rival in an ambiguous treaty which was interpreted by the Italian government to involve the suzerainty of Italy over Abyssinia, and money was coined with the impress of King Humbert wearing the Ethiopian crown. In 1890 the African possessions were consolidated into a colony, Eritrea. Led on by the first brilliant victories over the dervishes in 1893 and 1894, Crispi planned a vast African Empire; but in 1896 an Italian expeditionary force met with complete disaster at Adowah, and the suzerainty over Abyssinia had to be abandoned. In February, 1890, an Italian protectorate was established over the Somali Coast south of British Somaliland. After unsuccessful attempts by two private companies to administer the colony, the government took over the whole control in 1905. In 1906 an agreement was signed by Italy, France, and Great Britain. It was also with the connivance of France and Great Britain that Italy undertook the annexation of Tripoli in 1911. The international situation being favorable to Italian action, the government took advantage of the agreements relating to north Africa concluded with Great Britain and France, and an ultimatum was delivered in Constantinople September 27 which gave the Porte 48 hours in which to accept the occupation of the provinces of Tripoli by Italian troops and an Italian administration, with the provision that the Sultan's sovereignty should be secured and an annual subsidy paid by the new protectorate to the Porte. The Porte declined, and Italy proceeded to the occupation and blockade of the Libyan coast, while the Turks retreated into the interior, taking up the offensive and harassing the Italian lines. Austria deprecated any attack on the eastern coast of the Adriatic, and Russia took the same position with respect to the Dardanelles. As a result of the Italo-Turkish War, Turkey bound herself to withdraw her troops from Tripoli, but did not recognize the sovereignty of Italy. She was to have a representative to look after the interests of the Mohammedans in Tripoli, while Italy pledged herself to restore to Turkey the Ægean Islands occupied by the Italian troops and to pay that part of the Ottoman public debt which is guaranteed by the revenue of Tripoli and the Cyrenaica.

Foreign Policy. In foreign policy the prevailing tendency of Italian diplomacy in the decades following the unification of Italy was in the direction of an alliance with Germany. This was due in part to the attitude of France, because, until the defeat of the clerical and monarchical parties, there was always the danger of a French reoccupation of Rome. Furthermore, the energetic naval policy of Italy was held by France to endanger her interests in the Mediterranean. Italian ambitions with regard to Tunis, first stimulated by Austria and Russia at the Congress of Berlin (1878), were frustrated by the French occupation of that region as a colony in 1881 with the connivance of Great Britain and Germany. As the latter fact was unknown at the time in Italy, Bismarck contrived to utilize the strong resentment of Italy against France to bring about a rapprochement between Italy and Austria in spite of the strong Irredentist (see IRREDENTISM), anti-Austrian feeling in Italy, and, May 20, 1882, the famous Triple Alliance was concluded which has been renewed at various periods and for the last time in 1912 for 1912–17.

Relations with Austria, which had always been difficult on account of the movement for the restoration of the Italian provinces still held by Austria and the conflict between Austrian clericalism and Italian anticlericalism, were complicated still further after 1897 by the Italian distrust of the Balkan policy of Austria. The Austrian annexation of Bosnia and Herzegovina in October, 1908, agitated public opinion greatly, and the storm of indignation was only reduced slightly by economic arrangements for Italian railways in the Balkans. The menace of an Austrian Albania which often arose was settled by the agreement between the Powers for the preservation of Albania's independence in 1912. But the efforts made by Germany to reconcile Austria and Italy proved only of temporary value, and upon the outbreak of the war between the Triple Entente and the Dual Monarchy and Germany in 1914 loud demands were made upon the Italian government to fulfill the wishes of the Italian Irredentists and take Triest and Trent for Italy. As Italy had not been consulted in the negotiations leading to the Great War of 1914, she decided to remain neutral and not join Germany and Austria. This attitude of Italy was of great value to France because no troops were necessary to protect the Italian frontier. See WAR IN EUROPE.

On the other hand, the relations between Italy and the western European Powers have gradually improved in recent years. Since the close of the tariff war with France in 1898 and after the agreement of France on the Italian policy in Tripoli, a strong current of popular opinion expressed itself in sympathy with closer relations with France. As a result, agreements on Mediterranean and African affairs between Italy, France, and Great Britain were arranged, and in 1902 the French Ambassador at Rome declared that a conflict between the two Latin nations was no longer possible. The visit of President Loubet to Rome in 1904 confirmed these friendly relations, and Italian diplomacy supported France at the Algeciras Conference, although this antagonism to the aims of Germany in Morocco was rather resented by the latter. This same popular sentiment for France seems to have had a strong influence on the attitude of Italy at the outbreak of the European War of 1914. See NATIONAL COATS OF ARMS; NATIONAL FLAGS.

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ITALY, Free Church in, known also as the Evangelical Italian Church. An organization established by the Italian patriot and reformer Alessandro Gavazzi (q.v.) in 1870. He brought together 23 scattered independent congregations in a General Assembly. In 1874 a confession of faith was prepared, and the name Free Church in Italy was adopted. This confession was a declaration of the principles held by all evangelical Christians, and the Free Church is in harmony with the Waldensian and other Protestant churches. The constitution is partly Presbyterian and partly Congregational or Independent, the General Assembly being composed of deputies from the churches, and each church independent of all the others in local affairs. The General Assembly appoints the committee that superintends the entire work, and the funds collected by the commissioners are remitted directly to that committee. In 1891, by royal decree, the title Chiesa Evangelica Italiana was given to the church. It has spread rapidly. The church is divided into 10 districts, embracing about 40 congregations and 2000 communicants. It maintains elementary and Sunday schools. Among its buildings is the old church of San Jacopio in Florence, bought and presented by friends in Great Britain. The theological seminary, in which Gavazzi was professor of sacred rhetoric, was originally near the Vatican in Rome, but in 1891 was removed to Florence. The city of Florence gives an annual bounty to one or more of the Free Church schools.

ITASCA, I-tăs′kȧ, Lake (so named by Henry R. Schoolcraft, from the barbarous Lat. *veritas caput*, true head or source; Indian name, *Omuskosesagauegoum*). The largest of several small lakes, lying in a basin in Beltrami Co., Minn. (Map: Minnesota, B 3). It consists of three long, narrow arms—one extending to the north, from which emerges the Mississippi River (q.v.); one to the southeast; and one to the southwest. The arms are of about equal length; their combined shore length is about 13 miles, and the area of the lake is 1130 acres. The lake was discovered in 1832 by Henry R. Schoolcraft (q.v.). Itasca State Park, a tract including 19,700 acres, was created by an Act of the Minnesota State Legislature in 1891. For a detailed description of this region and its history, consult J. V. Brower, *Itasca State Park* (St. Paul, Minn., 1904).

ITA′TA (ė-tä′tȧ) **AFFAIR.** In American history, an affair rising from the seizure by the United States in 1891, for an alleged infraction of her neutrality laws, of a vessel, the *Itata*, owned by insurgents against the government of Chile. In April, 1891, this vessel was ordered to California for the purpose of receiving a large quantity of arms and munitions which an agent of the insurgent party had purchased in the United States with a view to sending them to Chile for the use of the insurrectionary forces. During her voyage to California the *Itata* had on board several small cannon and a few old muskets and at a Chilean port took on board 12 soldiers to serve as stokers. At Cape San Lucas the cannon and ammunition, together with the arms and uniforms of the soldiers, were packed in the hold of the vessel. The arms and ammunition purchased in New York, having been shipped to San Francisco, were loaded on a schooner, afterward were transferred to the *Itata* off the southern coast of California, and in due time the vessel proceeded on her way to Chile. By direction of the Attorney-General of the United States an effort had been made to detain her, on the ground that the neutrality laws of the country were being violated, but she succeeded in escaping from the officers left in charge of her. The cruiser *Charleston* was then sent in pursuit. The *Itata* was overtaken on June 4, was compelled to surrender to Rear Admiral Brown, and was given over to the custody of the United States District Court at San Diego for trial, on the charge of violating the neutrality laws of the United States. Upon trial it was held that the facts, as set forth above, did not constitute the fitting out of a hostile expedition against a government with which the United States was at peace, and that the mere purchase and transportation of arms to a party of insurgents in a foreign country in the ordinary course of trade was not a violation of the neutral duty of the United States or a violation of her neutrality laws. The affair aroused considerable excitement in the United States, and loud complaints were made of the manner in which the authority of the United States was defied by the officers of the vessel at San Diego.

ITATIAIA, ē'tȧ-tyī'ȧ. The highest mountain in Brazil. It is 9739 feet high.

ITCH (AS. *gycþa*, from *giccan*, OHG. *juochan*, Ger. *jucken*, to itch), also called SCABIES and PSORA. A parasitic disease of the skin, due to the presence of the larvæ or mature specimens of the *Acarus* (or *Sarcoptes*) *scabiei*, which burrows into the integument. The lesions are caused more by the scratching of the patient than by the presence of the insect. The resulting eruption is multiform, papules, vesicles, and large enchymatous pustules occurring, besides crusts and scratch marks. In mild cases or early in an attack the symptoms are itching, which is worse at night, and a few papules or vesicles. The diagnosis is established by the discovery of the *caniculus*, or burrow, left by the female insect in the skin in the course of depositing her eggs. This appears as a minute, dotted, brownish-black line, curved or sinuous, from ⅛ to ½ of an inch long, rarely several inches long. These burrows may easily be seen by rubbing a little ink over the surface and then wiping the skin clean. The male insect remains on the surface. The female enters the skin at once and may advance 1/20 of an inch a day. See ITCH MITE.

Scabies is said by Bulkley to be fairly common in the United States, forming 4.05 per cent among 200,000 cases of skin disease collected by the American Dermatological Association. It is more common in Europe, especially among the poor and uncleanly, though found in all classes. The disease is conveyed by direct bodily contact or by means of infected clothing or bed linen. Though other places may be first attacked, the earliest lesions are commonly found between the fingers and on the palmar surface of the wrist. The genital region, abdomen, thighs, anterior fold of the axilla, as well as all parts where there are warmth and pressure (as the waist and buttocks), are generally attacked, and in women the neighborhood of the nipples is early invaded by the eruption. The eruption may be looked for wherever the skin is thin. The dermatitis resulting from the parasite and from the scratching caused by the itching is a simple inflammation of the skin, resembling that caused by heat, cold, or mechanical irritants. The entrance of microörganisms into the abraded surface may cause pustular lesions. The treatment for the condition is first directed to killing the insects and their eggs. This result is effected by the use of sulphur. Naphthol, ichthyol, oil of cade, and carbolic acid are also used to allay the itching and reduce the inflammation. Reinfection from the patient's own gloves, muffs, bedding, etc., is possible—an accident which may be obviated by baking or boiling the articles.

DHOBIE ITCH, also called *Indian*, *Chinese*, or *Burmese ringworm*, is a form of tinea which attacks the opposite and inner sides of the thighs and the region of the genitals, the folds of the buttocks, the skin under the breasts or in the axilla, causing great suffering from the extreme itching and tenderness which accompany the appearance of the eruption. This variety of tinea (*Tinea trichophytina cruris*) occurs commonly in warm climates, though found in the United States. The treatment, which seldom fails, is the use locally of genuine sulphurous acid. The application of this remedy is to be followed by an ointment of tar and zinc, or compound tincture of green soap. See also BARBER'S ITCH; PRURIGO; RINGWORM.

ITCH. A parasitic disease of horses, dogs, and other animals. See MANGE.

ITCHANG. See ICHANG.

ITCHEN, ĭch'en. A growing town and suburb of Southampton, England, on the estuary of the Itchen. Pop., 1901, 13,097; 1911, 19,484.

ITCH MITE, *Acarus scabiei*, or *Sarcoptes scabiei*. Although the itch was undoubtedly known both to the Greeks and Romans, there is no certain evidence that a mite was recognized as the cause of the disease earlier than by Avenzoar, an Arabian physician of the twelfth century. Throughout the Middle Ages and till the nineteenth century the necessary connection between the disease and the mite was universally recognized. During the early part of the last century the existence of the itch mite was distrusted, until in 1834 Renucci, a Corsican student, demonstrated the existence of the creature. A case reported in 1892 by Dr. Robert Hessler, of Indianapolis, attracted much attention. The skin of the patient was estimated to contain 7,000,000 eggs and 2,000,000 mites.

The itch mites of the lower animals were formerly considered to be distinct from the species affecting human beings; but Raillet, the latest authority, believes them to be only varieties, and it seems therefore that human beings may be infested from certain of the domestic animals. The true human itch is *Acarus scabiei*, now known as *Sarcoptes scabiei hominis;* the Norway itch, *Sarcoptes scabiei crustosæ;* that of the horse, *Sarcoptes scabiei equi;* of the sheep, *Sarcoptes scabiei ovis*, etc. All stages of the parasite occur on the host, upon which it is absolutely dependent for existence.

The adult female mite is considerably larger than the male; it is visible to the naked eye and forms a roundish, grayish-white corpuscle, not unlike a starch granule; it is about ⅙ of a line in length and ⅐ in breadth. When seen under the microscope, it presents a truncated tortoise-like shape and is seen to be studded with hairs and bristles. The head terminates in two pairs of mandibles, and these mandibles afford good characteristic distinctions of the species. The males are much scarcer than the females.

Consult Raillet, *Zoölogie medicale* (Paris, 1895), and Osborn, *Insects Affecting Domestic Animals* (Department of Agriculture, Washington, 1896). See ITCH; ACARUS FOLLICULORUM.

ITCHWEED. A North American marsh plant with poisonous properties. See HELLEBORE.

ITENEZ, ē-tā'nāz. A river of Brazil. See GUAPORÉ.

ITH'ACA. An island in the Ionian Sea, the home of Ulysses (q.v.). See ITHAKI.

ITHACA. A city and the county seat of Tompkins Co., N. Y., at the head of Cayuga Lake, 56 miles northwest of Binghamton, on the Delaware, Lackawanna, and Western, the Lehigh Valley, and the Central New York Southern railroads, and on a branch of the New York State Barge Canal (Map: New York, D 6). The State in 1913 constructed in Ithaca a canal terminal basin. The city's situation is one of natural beauty. In addition to the scenery of Cayuga Lake that of numerous gorges and waterfalls in the vicinity adds to its attractions, the most noted of the falls being Ithaca, Triphammer, Buttermilk, Enfield, and Taughannock. The last, 215 feet in height, is the highest waterfall in the United States east of the Rocky Mountains. Cornell University (q.v.), which includes the New York State College of Agriculture and the New York State Veterinary College, is picturesquely situated on East Hill, about 400 feet above and overlooking the lake and the city. Other features are preparatory schools, the Cornell Library and reading room (founded by Ezra Cornell, q.v.), Ithaca Conservatory of Music, the United States Weather Bureau Station, and Renwick Park. Ithaca is in a productive farming and fruit-growing region. Its industries include the manufacture of chains for power transmission, guns, castings, calendar clocks, advertising signs, paper, gasoline engines and boats, bricks, and cement. There are also several plants for the manufacture of salt, which is derived from driven wells. The city owns and operates the water works. Under the charter of 1909 the government is vested in a mayor biennially elected, a council, a board of public works, and administrative officials, who, with the exception of the board of education, which is chosen by popular election, and of the city clerk, who is appointed by the board of public works, are appointed by the mayor. Among the public buildings are a city hospital, homes for aged women and children, and the public library. There are a charities association and a civic association organized for the purpose of affording playgrounds for children and of making the streets and parks of the city more attractive. Pop., 1890, 11,097; 1900, 13,136; 1910, 14,802; 1914 (U. S. est.), 15,510. Settled in 1789, Ithaca was variously called The Flats, The City, and Sodom, until about 1806, when Simeon De Witt gave it its present name. In 1821 it was incorporated as a village and in 1888 was chartered as a city. At Buttermilk Falls, near Ithaca, stood the Catawba Indian village Coreorgonel, built about 1753 and destroyed in 1779 (September 24) by a division of Sullivan's army. A bronze tablet now marks the location of one of Sullivan's encampments. Ithaca was for many years an important canal port because of its early connection with the Pennsylvania coal fields by the Cayuga and Susquehanna Railroad and its situation at the head of Cayuga Lake. It was a port of lading for barges carrying coal cargoes westward on the Erie Canal. Its traffic declined as through lines of railroad were built. Consult Selkreg (ed.), *Landmarks of Tompkins County* (Syracuse, 1894).

ITH'AKI (formerly *Ithaca*, Gk. 'Ιθάκη, *Ithakē*). One of the Ionian Islands, situated east of Cephalonia, from which it is separated by a narrow channel (Map: Greece, B 5). It is oblong in shape and has an area of about 38 square miles. Its surface is generally mountainous, rising in the northern part to an altitude of 2600 feet. The coasts are well indented, and the mountain slopes are covered with vines, olives, and other southern fruits. Besides the production of currants and oil, the natives also engage in seafaring and fishing. Administratively Ithaki forms a part of the Greek Nomarchy of Cephalonia and had in 1907 a population of 13,000. The chief town, Vathi, is the seat of a Greek bishop and in 1907 had a population of 6837. Ithaki is celebrated as the home of Ulysses, and some cyclopean ruins near Porto Molo are popularly reputed to be the remains of the castle of Ulysses.

ITHOME, ĭ-thō′mē (Lat., from Gk. 'Ιθώμη). In Greek mythology, one of the nymphs by whom the infant Zeus was nursed. The Messenian hill and fortress of the same name, known now as Vurkano, were called after her. See MESSENIA. Consult Pausanias, 4, 33, 1, with the notes on the passage by Metzig-Blümner.

ITHURIEL, ĭ-thū′rĭ-ĕl. 1. In Milton's *Paradise Lost*, one of the two angels sent by Gabriel to discover Satan, who had secretly entered the Garden of Eden to beguile Adam and Eve. Ithuriel accomplished this by his magic spear, which revealed deceit. 2. In Klopstock's *Messiah*, the guardian angel of Judas Iscariot, and, after his fall, the second angel of Simon Peter.

ITIN'ERANCY (from *itinerant*, from Lat. *itinerari*, to journey, from *iter*, OLat. *itiner*, journey, from *ire*, Gk. *ἰέναι*, *ienai*, Skt. *i*, to go). A term applied to the system of limited pastorates in the Methodist church. It originated with Wesley. To accomplish what he considered necessary for the revival of religion in England, he traveled from town to town and, remaining but a day or two in a place, adopted the plan of commissioning a few competent men to preach in the societies which he had organized. These helpers, as he called them, rapidly increased; but, the societies increasing still more rapidly, he found it necessary to extend and methodize their labors and accordingly appointed them to definitive circuits for a year. At first the whole country was divided into seven of these itinerant districts, and at Wesley's death there were 72 in England, 3 in Wales, 7 in Scotland, and 28 in Ireland. The circuits were long, and the preachers were changed from one circuit to another every year or two. The system was well adapted to conditions in America among the feebler churches and generally among the frontier settlements of the West. In course of time it came to be looked upon with disfavor by many in the Methodist Episcopal Church North of the United States. The length of time that a minister might remain in one place was lengthened from six months to a year, then to two years, next to three years, and then five years, and at the General Conference held in Chicago in 1900 the time limit was removed; but preachers are still appointed from year to year by the bishop.

ITINERA'RIUM. See ITINERARY.

ITIN'ERARY (Lat. *itinerarium*, from *iter*, OLat. *itiner*, journey). The name given by the Romans to a table of the stopping places between two cities of importance, with the distances from one to another. The itineraries of the ancients contribute much to our knowledge of ancient geography, and all seem to date from the later period of the Roman Empire. Of these the most important are the *Itineraria Antonini* and the *Itinerarium Hierosolymitanum*. The *Itineraria Antonini* are two in number, the *Itinerarium Provinciarum* and the *Itinerarium Maritimum*—the former containing the routes through the Roman provinces in Europe, Asia, and Africa; and the latter the principal routes of navigators, who then sailed mainly along the coasts. They take their name from Antoninus Caracalla, by whom they were first published, as corrected up to his time, but they seem to have been originally prepared at an earlier date. The *Itinerarium Hierosolymitanum*, or *Burdigalense*, was drawn up 333 A.D., for the use of pilgrims from Burdigala (Bordeaux) to Jerusalem. Among other examples is the *Itinerarium Alexandri*, in which the route of march of Alexander the Great is laid down; this was prepared in connection with the expedition of Constantius against the Persians (340–345 A.D.). A collected edition of ancient *Itineraria* was published in Paris in 1845 by D'Urban, *Recueil des itinéraires anciens*. Besides, the Antonine and Jerusalem itineraries are edited by Parthey and Pinder (Berlin, 1847); the *Itinerarium Alexandri* by Volkmann (Naumburg, 1871); that of *Antoninus Placentinus* by Gildemeister (Berlin, 1889). The itineraries thus far named belong to the *Itineraria Adnotata* or *Scripta;* they are in the nature of books, without maps. The famous so-called *Peutingerian Table* (q.v.) should be mentioned here as the chief example of the *Itineraria Picta* (Illustrated Itineraries); it is a traveler's map of all the great highways of the Roman Empire. It exists in a manuscript of the thirteenth century, but was originally compiled in the third or fourth century A.D., and is published by Miller, *Die Weltkarte des Castorius* (Ravensburg, 1888). At the mineral springs *Aquæ Apollinares*, near Vicarello in Tuscany, were found four silver cups in the form of milestones, inscribed with lists of the stopping places on the journey from Gades (Cadiz) to Rome. See ANTONINUS, ITINERARY OF.

IT IS NEVER TOO LATE TO MEND. A novel by Charles Reade (1856).

ITIUS PORTUS, ĭsh'ĭ-ŭs pôr'tŭs. The place whence Cæsar (54 B.C.) set out on his second expedition to Britain, probably the modern village of Wissant or Duessant, on the coast of France, near Boulogne. Consult T. Rice Holmes, *Ancient Britain and the Invasions of Julius Cæsar* (Oxford, 1908), and "Last Words on Portus Itius," in *The Classical Review*, vol. xxiii (London, 1909); the latter article corrects and supplements the earlier discussion.

ITO, ē'tō, HIROBUMI, MARQUIS (1841–1909). A Japanese statesman, born in the Province of Choshu. Under the patronage of the progressive daimyo Mori, he, with Inouye (q.v.) and others, eluded the vigilance of the Yeddo spies and in 1861 reached England, where they spent two years as students, but hurried home to dissuade the Choshu officers from war with the combined fleet of British, United States, Dutch, and French men-of-war at Shimonoseki (1864). Though unable to prevent hostilities, he assisted in the negotiations which followed, and helped to open the eyes and set the faces of his beaten clansmen to a new goal, the unity of all Japan under the Mikado, with enlarged powers and with new forms of civilization patterned after Western models. In 1871 he studied the coinage system of the United States, and his report resulted in the adoption of a decimal system of money and the establishment of the mint at Osaka. As one of the vice ambassadors, he accompanied Iwâkura (q.v.) round the world in 1872, in an effort to obtain from the Powers some modification of the treaties. He was made Minister of the Interior in 1878, and in 1882 visited Europe and the United States for the purpose of familiarizing himself with representative institutions preliminary to the establishment of a parliamentary régime in Japan. In 1885 the cabinet was reconstructed according to modern ideas, and in 1886 Ito became Minister President of State and carried out radical economic reforms. In 1888 he retired to prepare the long-promised written constitution, and on Feb. 11, 1889 (the anniversary of Jimmu Tenno), this magnificent instrument, more liberal in its provisions than some European governments allow, was promulgated. Ito is well called "The Father of the Constitution," and his volume of *Commentaries*, in illustration and defense of Japan's fundamental law, is worthy to rank with the *Federalist*. As Premier, he carried the nation through the Chino-Japanese War of 1894–95, and, on resigning in favor of the Yamagata régime in 1896, was created Marquis. He was again Premier from January to June, 1898, and from October, 1900, to June, 1901, and in the last year traveled in Europe and the United States, receiving the degree of LL.D. from Yale University. In St. Petersburg he is believed to have labored for an understanding with Russia and, failing, set on foot negotiations which resulted in the alliance with Great Britain in 1902. In 1903 he became President of the Privy Council. After the outbreak of the Russo-Japanese War he went to Korea as special adviser to the Emperor in accordance with the treaty of alliance between the two countries concluded Feb. 23, 1904. During the progress of the war the advice of Marquis Ito was largely effective in shaping the course of diplomatic events. To his influence was generally attributed the action of the government in concluding peace at Portsmouth on terms profoundly distasteful to the great mass of the Japanese nation. In November, 1905, he negotiated with Korea a convention by which the foreign affairs of that country were placed under the control of a Japanese resident general, receiving the appointment in 1906. On Oct. 26, 1909, he was assassinated by a Korean at Harbin. Consult: J. W. Foster, "Marquis Ito, the Japanese Statesman," in *International Quarterly*, vol. ix (New York, 1904); G. T. Ladd, *In Korea with Marquis Ito* (ib., 1908); J. H. Longford, "Reminiscences of Prince Ito," in *National Review*, vol. liv (London, 1909); K. Nakamura, *Prince Ito, the Man and Statesman* (New York, 1910).

ITO, YUKO (or SUKENORI), COUNT (1843–1914). A Japanese naval officer, born in Satsuma Province. He studied at the Kaisei Naval College in Tokyo and entered the Imperial navy in 1868. In the civil war of 1877 he commanded the *Nisshin*. He was promoted captain in 1882, rear admiral in command of the standing squadron in 1886, and vice admiral and chief of the Yokosuka naval station in 1892. In the war with China, as commander in chief of the combined squadron, he fought the battle of the Yalu. He was made Viscount in 1895 and Count in 1907, having been chief of the naval general staff from 1895 through the war with Russia and being appointed fleet admiral in 1905.

ITONAMAN, ē'tō-nä'man. A stock of northeast Bolivia, South America. Consult Chamberlain, in *Journal de la Société des Americanistes de Paris*, vol. vii (n. s., Paris, 1910).

ITRI, ē'trē. A town in the Province of Caserta, Italy, 90 miles southeast of Rome, about 6 miles northwest of Formia. It has a ruined castle and houses built from the masonry of the ancient Via Appia. It was the native place of Fra Diavolo, whose history is echoed in Auber's opera and in Washington Irving's *The*

Inn of Terracina. Cicero was murdered near Itri, and a large tower on the outskirts of the town is supposed to be his tomb. Pop. (commune), 1901, 5797; 1911, 6077. Consult Baedeker, *Southern Italy and Sicily* (16th Eng. ed., Leipzig, 1912).

I-TSING, ē'tsĭng', or YI TSING (635–713 A.D.). One of the three great Chinese Buddhist travelers in India. The names of the other two were Fa-Hien and Hiuen Thsang (see HWEI-SANG). I-Tsing was born in the year 635 at Fan-Yang, near Peking, and he became a devoted follower of the Buddhist religion. In 671 he went on a pilgrimage to India in order to journey through the holy land of Buddhism, and he spent nearly 25 years visiting scenes connected with Buddha's life, at the same time collecting texts and material relating to the faith. He returned to China in 695 and devoted the remainder of his life to translating, in more than 100 volumes, the treatises and books which he had gathered. In this way he became the founder of a school for the study of Buddhist literature in China. His work is of special importance also as a record and description of India and the Malay Archipelago at the time when he lived. His death occurred in 713. His account of India has been translated by J. Takakusu, *A Record of the Buddhist Religion as Practiced in India and the Malay Archipelago* (Oxford, 1896). Another work giving an account of the travels in India of 60 Chinese pilgrims of the seventh century B.C., was published by Chavannes, *Les religieux éminents qui allèrent chercher la loi dans les pays d'occident* (Paris, 1894).

ITSUKUSHIMA, ĭt'sụ-kụsh'ē-mȧ. See MIYAJIMA.

ITÚ, ē-tōō'. A town in the State of São Paulo, Brazil, situated in a fertile region on the Tieté River. It has a Franciscan monastery, a hospital, iron and bronze foundries, cotton manufactures, and a trade in coffee; it is one of the most important industrial centres of Brazil. Pop., 11,000.

ITUCALEAN, ē-tōō'kȧ-lā'*a*n. A stock on Rio Chambera, Ecuador and Brazil, South America. Consult Chamberlain, in *Journal de la Société des Americanistes de Paris*, vol. vii (n. s., Paris, 1910), and Beuchat and Rivet, in *Zeitschrift für Ethnologie* (Berlin, 1909); the latter suggest that the Itucale may be Panoan.

ITURÆA (ĭt'ū-rē'ȧ) **AND THE ITURÆANS**, ĭt'ū-rē'*a*nz. A border people and district between Syria and Arabia, referred to frequently by classical writers, by ancient historians, and mentioned once in the New Testament (Luke iii. 1). The people doubtless go back to Jetur, one of the sons of Ishmael (Gen. xxv. 15; cf. 1 Chron. i. 31, v. 19). Because of their seminomadic character they had for a long time no permanent region of abode, so that it is not until the fourth century of the Christian era that we find any reference to a specific district, *Ituræa*—Luke's phrase (iii. 1) describing an undefined border region, partly Ituræan and partly Trachonitic, as in Acts xvi. 6. At the same time these people moved within a somewhat defined territory, located in the Anti-Lebanon country, with Chalcis as their capital—a territory which in 105 B.C. spread southward to the borders of Galilee and doubtless southeastward towards Trachonitis, as indicated in the Lukan phrase (iii. 1). They were Arabians, whose old home was to the northwest of Medina, but who at a very early period moved northward in search of new quarters. Some time before the exile they came in conflict with Israelites east of the Jordan. In the second century B.C. Aristobulus I, King of Judæa, conquered some of their bands and annexed their territory to Judæa. Their first-known ruler was Ptolemy, son of Mennæus (c.88–40 B.C.). He controlled the valley between the Lebanons, and his influence extended nearly to Damascus. Later he was conquered by Pompey, from whom he secured immunity by a payment of 1000 talents. In 40 B.C. he was succeeded by his son, Lysanias, whom Mark Antony confirmed in his position, but afterward (36 B.C.), at Cleopatra's instigation, put to death, and gave his dominions to the cruel and covetous Queen. The extensive domain was leased to Zenodorus, as tetrarch, but, because of his implication in the robber raids of Trachonitis, a part of his tetrarchy was taken from him and given to Herod, a grandson of Herod the Great. Another portion, with its capital at Abila (see ABILENE), was placed under the rule of the Lysanias mentioned in Luke iii. 1. On the death of Zenodorus (20 B.C.) what remained of his domain was added to Herod's kingdom. At Herod's death (4 B.C.) it fell to his son Philip (Josephus, *Ant.*, xv, 10, 3), who is called by Luke (iii. 1) tetrarch of the Ituræan and Trachonitic region. Philip held this region until his death in 34 A.D. In 37 A.D. Caligula gave the two tetrarchies to Agrippa I, with the title of King. Agrippa was confirmed in this possession by Claudius (41 A.D.) and secured from him in addition the entire kingdom of his grandfather Herod. On Agrippa's death (44 A.D.) his dominion was incorporated into the Roman Province of Syria. The Ituræans were warlike, famed as archers, and from the days of Cæsar many of them served in the Roman armies. Cicero accused Mark Antony of seeking to terrify the Senate with his Ituræan guards (*Philippics*, ii, 19, 112; xiii, 18), and cohorts of Ituræan troops are frequently mentioned in the inscriptions of the first and second centuries. Consult Schürer, *History of the Jewish People in the Time of Jesus Christ*, vol. i (New York, 1896), and G. A. Smith, *Historical Geography of the Holy Land* (11th ed., ib., 1904).

ITÚRBIDE, ē-tōōr'BĒ-DȦ, AGUSTÍN DE (1783–1824). Emperor of Mexico. He was the son of a nobleman of Navarre, who emigrated to New Spain shortly before the birth of his son, who was born at Valladolid (since 1828 known as Morelia), Sept. 27, 1783. Don Agustín entered the army in 1798 and during the insurrection of 1810 fought for the Spanish cause. He was advanced to the position of commander in chief of the provinces of Guanajuato and Michoacan in 1815, but this post was soon taken away from him.

From 1816 to 1820 Itúrbide was out of the military service. When in this latter year, and by order of the Cortes, the constitution of 1812 was proclaimed, the Viceroy gave him command of the Spanish Army of the South, with orders to proclaim the absolute power of Ferdinand VII; but Itúrbide began a series of intrigues with the revolutionary leaders, which culminated in his proclamation of Feb. 24, 1821, the so-called Plan of Iguala, wherein complete independence of Spain under a prince of the royal family was offered to the people. This plan rapidly gained adherents. From a small force of some 2500 men, with which he had left Mexico in November, 1820, his army had increased, by the spring of 1821, to 6000. He gained possession of Vera Cruz and Puebla, and on September 21 entered the city of Mexico at the head of 16,000 men. The Viceroy signed a treaty with the insurgents, providing for the adoption of the Plan of Iguala, and stipulating, in addition, that in case of the refusal of the princes of the royal family to occupy such a position, the Mexicans should choose an emperor for themselves. A regency was formed, with Itúrbide at its head, and he was at the same time appointed commander in chief of the army. A national congress was convened at Mexico. The new government avoided harsh measures and succeeded in establishing peace, but dissensions broke out in the regency, the troops became clamorous for pay, and the congress refused to meet their wishes. Itúrbide turned to the monarchical party and was by them proclaimed Emperor on May 18, 1822. He was crowned, with the title of Agustín I, July 21, 1822. Harsh measures of repression led to open rebellion. On Dec. 2, 1822, Santa Anna, colonel of a regiment stationed at Vera Cruz, declared for a republic, and his example was followed by Guerrero and Bravo in the south. Itúrbide saw himself deserted by those in whom he had placed most confidence, and sought to make his peace with the country by summoning the congress which he had shortly before dissolved. His influence, however, had disappeared, and in March, 1823, Itúrbide offered his abdication to the congress. He received a pension of $25,000 and was ordered to reside in Italy. He accordingly left Mexico, spent the next year in Italy and England, and in May, 1824, sailed for Mexico from London, unaware that the Republican government had outlawed him, and led by the representations of his partisans to believe that Mexico would rise in arms to welcome him. He landed at Soto la Marina, July 14, but was immediately arrested, taken before the provincial congress of Tamaulipas, condemned as a traitor by that body, and shot in the public square of the town of Padilla, July 19. The Mexican government provided a pension for his wife, who resided for a number of years in Philadelphia, died there, and was buried in St. John's (R. C.) Church. His grandson, Agustín, was adopted by the Emperor Maximilian as his heir in 1864. Consult, for a full account of Itúrbide, with descriptive lists of authorities cited, H. H. Bancroft, *History of Mexico*, vol. iv (San Francisco, 1890); Agustín de Itúrbide, *Statement of Some of the Principal Events in the Public Life of Agustín de Itúrbide*, translated by M. J. Quin (London, 1824; Fr. trans. by J. T. Parisot, Paris, 1824); C. M. de Bustamente, *Historia del Emperador Itúrbide hasta su muerte, y sus consecuencias, y establecimiento de la República Federal* (Mexico, 1846). See MEXICO.

ITURUP, ē′tų-rōōp′. An island of Japan. See ETOROFU.

I′TYS (Lat., from Gk. Ἴτυς). In classical mythology, the son of Tereus and Procne, killed by his mother and served in a dish to his father. See PHILOMELA.

ITZÁ, ė-tzä′. An important people of Mayan stock, occupying the country about Lake Petén, in northern Guatemala. Their dialect is the Maya proper. The ruined city of Chichén-Itzá (q.v.) in Yucatan takes its name from them, and, according to their own tradition, they removed thence on the breaking up of the Maya kingdom about 1420 and built a new city on an island in the lake. They were visited by Cortés in 1525, but maintained their independence until 1697, when their country was invaded by the Spaniards under Ursua, who stormed their island capital, slaughtering or driving into the lake great numbers of their people, and razing to the ground the 21 temples on the island. Among other spoils taken from the house of the King was a library of sacred books, written in hieroglyphics upon bark fibre, and containing their historical traditions, calendars, and rituals, all of which were probably destroyed by the conquerors. The earlier history of the Itzá is closely woven into that of the great Maya civilization. The Maya chronicles, called Books of Chilan Balam, relate to them more than to any other tribe and carry their records back into the fifth century A.D.

ITZAMNÁ, It′sȧm-nä′. The mythic culture hero of the Maya of Yucatan, who, according to their traditions, ruled over them as King at an early period, building cities, devising a code of laws, and inventing their calendar and hieroglyphic system. He was also claimed as a teacher of agriculture, a miraculous healer, and the ruler of the winds and rains. His shrine at Izamal was a noted resort of pilgrims throughout the whole territory occupied by the tribes of Mayan stock. From the fact that he is said to have come from the East, and from an analysis of his various titles, among which are Lord of the Eye of the Day, Lord of the Wheel of the Months, etc., some scholars conclude that Itzamná is a personification of light. In the objective studies which have been made on Maya manuscripts and sculptures there is a very important god who appears in the guise of a benevolent old man and who is called God D, or the Roman-nosed God. This is probably to be identified as Itzamná, whereas the equally important Long-nosed God may be Kukulcan. Consult Shellhas, "Representation of Deities of the Maya Manuscripts," in *Papers of Peabody Museum*, iv, no. 1 (Cambridge, Mass., 1904), and Spinden, "Maya Art," in *Memoirs of Peabody Museum*, vi (ib., 1913).

ITZCOATL, ēt′skō-ä′t'l, **IZCOHUATL**, ēs′-kō-wä′t'l, or **IZIOCATL**, ē′sē-ō-kä′t'l (?–1440). First Emperor of the Aztecs. He began to reign in 1427 and joined with the princes of Acolhua and Tlatelulca in an attempt to throw off the yoke of Maxtla, Emperor of Tepanec. They succeeded after a campaign of nearly four months and captured the tyrant, of whom they made a sacrifice. Itzcoatl afterward did much for the mental and material improvement of his own state and people. Consult H. H. Bancroft, *Native Races*, vol. v (San Francisco, 1882).

ITZEHOE, It′se-hō. A town in the Province of Schleswig-Holstein, Prussia, situated on the Stör, 32 miles northwest of Hamburg (Map: Prussia, C 2). It contains a twelfth-century church, a Rathaus dating from 1695, a memorial to Kaiser Wilhelm I, and a home for the aged, founded in 1240. There are manufactures of sugar, nets, Portland cement, soap, carpets, textiles, dyestuffs, machinery, iron, chicory, and cigars; it also builds ships. There is an extensive trade in cereals, cattle, lumber, and wine. Pop., 1900, 15,649; 1910, 16,547. Itzehoe, the oldest city of Holstein, had its origin in a castle erected in 809 during the reign of Charlemagne as a barrier against the Danes. The town received Lübeck rights in 1238 and was the residence of the counts of Holstein.

IUKA, ī-ū'kȧ. A city and the county seat of Tishomingo Co., Miss., 114 miles east by south of Memphis, Tenn., on the Southern Railroad (Map: Mississippi, J 1). It is known for its mineral springs and has a coeducational normal institute. There are some lumbering interests. The electric-light plant is owned by the city. Pop., 1900, 882; 1910, 1221.

On Sept. 19, 1862, during the Civil War, it was the scene of a battle between a Federal force of about 10,000 under General Rosecrans and a Confederate force of about 12,000 under General Price, the latter retreating during the night, though neither side gained any decisive advantage. The Federal loss in killed, wounded, and missing was between 700 and 800, and the Confederate loss was about the same.

IU'LUS, ĭ-ū'lŭs. The son of Æneas, later called Ascanius. (Consult Vergil, *Æneid*, bk. i.) According to some, the son of Ascanius also bore the name of Iulus. See ASCANIUS.

IVAN, *Russ. pron.* ē'van' (Russ., John). The name of a number of Russian grand dukes and czars, of whom the most notable were the first, third, and fourth.

IVAN I KALITA (?–1341) laid the foundations of the Muscovite Kingdom. Though one of the younger princes by birth, he obtained through extreme subserviency to the Tatars the title of Grand Prince (1328). His influence was still more strengthened when he was appointed by the Khan collector of the Tatar vikhod (tax) for all the principalities of Russia. In this capacity he became practically the Khan's plenipotentiary in his relations to the Russian princes, and he made use of his position to weaken his antagonists. He also managed to accumulate great wealth (hence his nickname Kalita, i.e., bag of money). He extended considerably the limits of his originally small principality by the purchase of land, villages, and even of entire town districts (like Bieloe, Ozero, Galitch, etc.), as well as by conquest and diplomatic negotiations. His high position with the Tatars helped him to accelerate this process and to raise Moscow from the position of an obscure village to that of the leading city of Russia. The *Chronicle* calls him "the first to knit the Russian soil together" and particularly praises him for having stopped the Tatar raids and thus having brought peace to the land. He was also strong enough to "rid the country of robbers" and to secure public safety. The introduction into Russia of the Byzantine criminal code and of agrarian laws (the "Law of Landowners") is also attributed to Ivan Kalita. One of his achievements was the transference of the seat of the Metropolitan to Moscow (in 1326), which made it the religious as well as the political centre of Russia. This act greatly increased the prestige of the Moscow government, whose acts henceforth seemed to be sanctioned by the chief religious authority of the country.

IVAN III THE GREAT (1440–1505) was coruler of his father Vasili the Dark and succeeded him as Grand Prince in 1462. He successfully continued the policy of his predecessors which aimed to unite all Russia under the leadership of Moscow and to strengthen the power of the princely dynasty. He suppressed the appanage principalities and the democratic commonwealths, threw off the Tatar yoke, abolished the privileges of the boyars (see BOYAR), and entered into a long struggle with Lithuania in order to regain some of the Russian districts which had joined the latter country. The free city of Novgorod had already been devastated by Ivan's father and predecessor Vasili, who had exacted from the city 15,000 rubles and an oath of loyalty to Moscow. To find protection against Muscovite oppression, the leading political party of Novgorod had sought the help of Lithuania. A treaty was concluded in 1471 with the Lithuanian King, Kasimir, which secured for Novgorod all its former privileges and liberties under the protection of a Lithuanian viceroy. Ivan III grasped this opportunity to declare the people of Novgorod strangers and traitors to "orthodoxy," and in two punitive expeditions of 1475 and 1477 he conquered Novgorod and annexed it to Moscow. The democratic institutions of the ancient free city were abolished, thousands of its best families were transported into the interior parts of Muscovy, and Muscovites were settled in Novgorod. With its freedom Novgorod also lost its commercial significance. The independent princes of Yaroslav and Rostov voluntarily joined Moscow, while Iver and Viatka were conquered by force of arms in 1485 and 1489. The people of the minor principalities at this period often desired union with Moscow, and the territorial extension began to assume a national and religious character. In 1480 submission to the Golden Horde (q.v.) was completely cast off, though it had been but nominal for some time; somewhat later the once terrible Golden Horde was demolished by the Crimean Khan (1502). The wars with Lithuania (1492–94 and 1500–03) resulted in the annexation to Russia of the cities of Chernigov, Rilsk, and Starodub in the ancient Russian territories of Smolensk and Sieversk. This territorial extension brought Muscovite Russia face to face with Poland and western Europe. The external relations of the country, hitherto confined within the circle of the various principalities of Russia, developed now into important diplomatic relations with western Europe—with Poland, Lithuania, Sweden, the Teutonic and Livonian Order of Knights, the Emperor of Germany, the Pope, etc. The forcible and successful foreign policy resulted in the strengthening of the idea of national unity under the leadership of an absolute monarch. The second marriage of Ivan III with Sophia Paleologue, niece of the last Byzantine Emperor, in 1492, favored the growth of these ideas. Sophia never gave up her title of Byzantine Princess, transferred her prestige to Moscow, sharing it with her husband, and "taught him to penetrate the secrets of autocracy." From this time on, the double eagle took its place in the Russian arms and Russia claimed to be the legitimate successor of Constantinople as head of the Empire and Greek church. Ivan's full title now read: "Ivan, by the Grace of God, Emperor of all Russia, Grand Duke of Vladimir and Moscow and Novgorod and Pskov and Tver and Perm and Urga and Bolgari and the rest." Ivan took great interest in internal improvements. In 1497 he issued the *Sudebnik* (q.v.), a uniform code of laws for the country which laid down definite rules of judicial procedure. He invited also artists and craftsmen from Italy to encourage Russian industry and art and embellished Moscow with buildings, the most famous of which is the Uspensky Sobor (cathedral of Assumption). Ivan III died in 1505 and left to his eldest son and successor, Vasili, 67 of his towns and districts and but 30 to all his other sons. In his will Ivan set forth a new rule of succession according to which the domains of all his kinsfolk after their death were to pass directly to the reigning grand duke instead of reverting, as before, to the prince's heirs.

Ivan IV the Terrible (1530–84), son of Vasili, was born in 1530 and was three years of age when his father died, his mother, Elena Glinski, being left as Regent. The government fell into the hands of the turbulent boyars and passed from the hands of one notable family of boyars to those of another. This gave rise to struggles which were marked by atrocities and numerous executions. These impressions of his youth and his "wretched" education turned Ivan into a dissolute, unbalanced, and cruel man, who was however swayed from time to time by good and noble impulses. These circumstances and his education were also responsible for his hate of the boyars. The Archbishop Macarius, author of the famous *Chetee Minei* (Lives of the Saints), was the only enlightened man near Ivan. He inspired Ivan with love for reading, developed his intellect, suggested to him the idea of Moscow being the third Rome, and encouraged him in his ambition to raise the Grand Duchy to an "Orthodox Czardom." Ivan had hardly reached his majority when he declared his desire to marry and to be coronated as Czar (q.v.). The solemn act was performed in 1547; the same year he married Anastasia of the house of Romanov (q.v.). The great fire of Moscow and the ensuing revolt of the people "brought fear into Ivan's soul"; he took new councilors, chief among whom were a priest Silvester, a nobleman Adashev, and several notable princes, as Kurbsky, Vorotinsky, etc. By this "chosen council" the government was directed for 13 years, which form the first successful and happy period of the reign of Ivan IV. In 1550 the first Zemski Sobor (q.v.), or National Assembly, was summoned. The Sobor considered and sanctioned a new and improved code of laws. In 1551 an Ecclesiastical Sobor codified the rules of church administration and of religious life in general in a book of 100 chapters. As a result of these Sobors, local self-government and administration were radically reformed and developed. In 1552 Kazan was conquered, and in 1556 the conquest of Astrakhan followed. The subjugation of these Tatar Khanates secured peace for the eastern frontier of Muscovy and opened up the gates to the east beyond the Ural Mountains by way of the rivers Kama and Viatka. In 1560 the young wife of Ivan died and Silvester, Adashev, and his "chosen councilors" lost their influence on the Czar; some of them were exiled or imprisoned, others entered the service of Lithuania. Ivan began a life and death struggle against the boyars. In 1564 the Czar left Moscow for the suburb Alexandrovo, and in 1565 he addressed to the capital two gramotas (letters, edicts)—one to the clergy and boyars, and the other to the "Orthodox Christians" of Moscow City. In his first gramota the Czar enumerated "the treasons of the boyars, the voyevodas (chiefs of town districts) and of all prikaznikh (officials)." In his second gramota, which was read in the public forum, Ivan thanked the people for their loyalty. The appeal to the people had its effect: a deputation of Muscovites, headed by the clergy, succeeded in gaining Ivan's consent to return to Moscow, on the condition, however, that he should be free to deal with his enemies as he saw fit, and to establish an oprichnina, a sort of separate estate for himself and his household administered by his bodyguard, or oprichniki. With the oprichnina well organized the Czar began his campaign of making the boyars "harmless." One by one he subjected to the jurisdiction of the oprichnina the cities and districts which were situated in the territories of the former udiels (appanages), transferring the descendants of the princely families to the borderlands, where there were no appanage traditions. Their hereditary estates were distributed among his favorites and loyal bodyguards, who thus became landowners. For nearly 20 years, to his very death, Ivan continued this policy, reducing nearly half of the country to the status of oprichnina. The other half, called, in distinction of the oprichnina, zemchina, continued to be governed as formerly by the Boyarskaya Duma (council of boyars). The oprichnina accomplished the task of humiliating the ancient nobility of princely origin and of reducing them to the status of "men of service." The process was accompanied by many cruelties, which gained for Ivan the sobriquet "Terrible." The oprichnina strengthened absolutist tendencies, but it weakened the country and may be held responsible for the disastrous end of the wars with Lithuania and Sweden. The subjugation of Kazan and Astrakhan by the Russians brought Russia into contact with the Sultan of Turkey, who repeatedly demanded the return of the Khanates. In 1571 the Crimean Khan, a vassal of Turkey, entered and burned Moscow. But when the Tatars appeared the following year near the river Oka, they suffered a terrible defeat. These events, however, led the Russian government to consider the defense of its southern frontier. Heretofore the southern frontier of Muscovy had been along the middle Oka. During the reign of Ivan many Russians settled beyond the Oka on the "ukraina" (border), or in the "wild field." These colonists were known as "free Cossacks"; they did not recognize any governmental authorities, except their own elected atamans (chiefs). In 1571 the Muscovite government began to settle her own colonists and to fortify the "wild field." Towards the end of the sixteenth century the entire field to the rivers Vorskla and northern Donetz was dotted with towns and fortresses and became an integral part of Muscovy. This secured protection against Tatar raids and opened the way for the colonization of the rich black-soil territory of modern middle Russia. The "free Cossacks," however, to avoid submission to Muscovite authorities, left these places and settled in the country at the mouth of the river Don, where they gave rise to the Cossacks of the Don. (See Cossacks.) The decline of Novgorod made it necessary for Russia to have a port on the Baltic Sea. The Knights of Livonia handicapped the commercial and industrial development of Russia by prohibiting Russian merchants from passing through their territory and preventing foreign merchants, artisans, and artists from going to Russia. In 1558 Ivan began a war with Livonia. To avoid annexation to Muscovy, Livonia divided and in separate parts joined Sweden, Lithuania, and Poland (1560–

61). In 1576 Stephen Bathory was elected to the Polish-Lithuanian throne and defeated the Muscovites several times. In 1581 peace was concluded through the mediation of the papal emissary, Possevin. Ivan had to give up all his claims in Livonia and to return to Lithuania all the territory formerly conquered by his armies. In 1583 a treaty was made with Sweden according to which Russia had to give up several cities (Yam, Koporie, and Korelu). Two other important events took place during the reign of Ivan IV. In 1553 an English expedition, headed by Chensler, seeking a northwest passage through the Arctic Ocean, made its appearance at the mouth of the northern Dvina. Chensler found his way to Moscow, was favorably received, and returned two years later as the first English Envoy to Russia. In 1584 the city of Archangel was built, and commercial relations with England were entered into. The other important historical event was the beginning (1582) of the conquest of Siberia (q.v.) by Yermak.

Some historians, like Professors Chistowitz and Kovaleoski, find in Ivan the Terrible signs of insanity. In a fit of fury he killed his eldest son, Ivan (1580). Ivan was married seven times. He died in 1584, leaving only two young sons. Consult Kazimierz Waliozewski, *Ivan the Terrible* (Philadelphia, 1904), containing a bibliography, and A. S. Rappoport, *Mad Majesties, or Raving Rulers and Submissive Subjects* (London, 1910).

IVANGOROD, ē-vän′gō-rōt. A fortified town at the confluence of the Wieprez with the Vistula in the Province of Sedcle, Russian Poland, about 60 miles southeast of Warsaw (Map: Russia, B 4). With Warsaw, Novo-Georgievsh, and Brest-Litovsk, it forms the important Polish "quadrilateral." Pop., 1912 (est.), 5500. Ivangorod was the high-water mark reached by the Germans during their first drive on Warsaw in the European War which broke out in 1914. Here the Russians stopped the combined Austro-German offensive movement, compelling them gradually to retire from Russian Poland. See WAR IN EUROPE.

I′VANHOE. A novel by Sir Walter Scott (1819) and the name of the hero.

IVAN IVANOVITCH, ē-vän′ ē-vä′nō-vĭch (Russ., John Johnson). See NATIONAL NICKNAMES.

IVANOVO-VOZNESENSK, ē-vä′nō-vō väz′-nyĕ-syĕnsk′. A manufacturing town of Russia, in the Government of Vladimir, situated on the river Uvod, 25 miles by rail north of Vladimir (Map: Russia, F 3). It consists of the village of Ivanovo on the right bank of the river and Voznesensk on the left bank, incorporated in 1871 as the town of Ivanovo-Voznesensk. It is the second important centre of the Russian cotton manufacture, which gives employment to a great part of the inhabitants, not only of the town, but also of the surrounding district. There are also large cotton-printing and chemical establishments in the town, as well as large ironworks both in the suburbs and in the town. Ivanovo-Voznesensk is connected by a branch line with the Moscow and Nizhni Novgorod Railway. Pop., 1897, 53,900; 1912, 167,726.

IVARA. See JUVARA, FILIPPO.

IVERACH, ĕ′ve-răk, JAMES (1839–——). A Scottish philosopher and theologian, born in Caithness. He was educated in Edinburgh at the University and New College; was ordained minister of the United Free Church at West Calder in 1869; was minister at Ferryhill, Aberdeen, from 1874 to 1887; and in the United Free Church College at Aberdeen was professor of apologetics from 1887 to 1907, then professor of New Testament language and literature, and principal after 1905. Iverach was moderator of the United Free church in 1912–13. He contributed many articles to the *Spectator* and published: *Evolution and Christianity* (1884), *Life and Times of St. Paul* (1890), *The Truth of Christianity* (1895), *Theism in the Light of Present Science and Philosophy* (1899), *Descartes, Spinoza, and the New Philosophy* (1904).

IVER′NA. See HIBERNIA.

IVES, īvz, FREDERIC EUGENE (1856–). An American inventor, born at Litchfield, Conn. In 1874–78 he had charge of the photographic laboratory at Cornell University. He did much pioneer work in developing photographic processes, with special reference to orthochromatic and trichromatic photography and to photoengraving. Among many devices invented by Ives is the parallax stereogram. He received the Cresson and Scott Legacy medals of the Franklin Institute, Philadelphia, the Progress and Science medals of the Royal Photographic Society, London, and the Rumford medal of the American Academy of Arts and Sciences.

IVES, HALSEY COOLEY (1846–1911). An American artist and museum director, born at Montour Falls, N. Y., and trained at South Kensington, London, and under Piatowski. He had charge of the Art Department at the Chicago World's Fair in 1893, and in 1904 of the corresponding department at the St. Louis Exposition, where he received a grand prize for services to art education. He several times represented the United States government as a commissioner abroad with reference to art matters. In 1896 he became director of the Museum and School of Fine Arts at St. Louis.

IVES, LEVI SILLIMAN (1797–1867). An American theologian. He was born at Meriden, Conn.; was brought up on his father's farm in Turin, N. Y.; served during the first year of the War of 1812 and studied at Hamilton College; but in 1819 left the Presbyterian for the Episcopal church, and after study in New York was ordained in 1823. He preached at Trinity Church, Philadelphia, from 1823 to 1827; at Christ Church, Lancaster, Pa., in 1827; and in Christ Church, New York, until 1831, when he became Bishop of North Carolina. There his Tractarian views brought him into trouble; he recanted, but again embraced them, and was declared deposed by his act of submission to the Pope in 1852. His apologia, *The Trials of a Mind in its Progress to Catholicism*, was published in 1854. Ives spent his last years as a professor in St. Joseph's Seminary.

ĪVIZA, or **ĪBIZA**, ĕ′bē-thȧ. The larger of the two Pityusæ Isles of the Balearic group, belonging to Spain (Map: Spain, F 3). It is situated about 60 miles from the mainland and 56 miles southwest of the island of Majorca. Area, about 230 square miles. The island is mountainous and well wooded, with fertile valleys. The principal industry is the production of salt by the evaporation of sea water led into large shallow lagoons. Pop., 1900, 23,556; 1910, 24,608. The chief town, Iviza, on the southeast coast, has a fair harbor and a large trade in salt. Pop., 1900, 6327; 1910, 6225.

IVO OF CHARTRES, shär′tr′, SAINT (c.1040–

1116.) A mediæval Churchman, Bishop of Chartres, sometimes called Yvo Carnotensis. He was born in Beauvais, studied at Bec, where he was a companion of Anselm, rose to the provostship of the canonry of Saint-Quentin in Beauvais, and in 1090 was consecrated Bishop of Chartres by Pope Urban II. Ivo is one of the heroic figures in French mediæval history, appearing now as the dauntless opponent of royal injustice and now as the determined foe to clerical wrongdoing. He figures in the investiture controversy of his time as one of the mediating and mollifying forces, endeavoring to see that both church and state were properly treated. (See INVESTITURE.) He compiled a collection of canon law which is one of the most important precedents to Gratian's, edited by Fournier (Chartres, 1896–97). His letters are one of the sources for the history of his time; a French translation, edited by Merlet, was published at Chartres, 1885. His works are in J. P. Migne, *Patrologia Latina*, vols. clxi, clxii (Paris, 1854–55).

I'VORY (OF. *ivurie*, *ivoire*, Fr. *ivoire*, It. *avario*, ML. *ebureum*, from Lat. *ebur*, ivory, from Egypt, *ābū*, *āb*, Copt. *ebou*, *ebu*, elephant). The name formerly given to the main substance of the teeth of all animals, but it is now restricted to that modification of *dentine*, or tooth substance, which in transverse sections shows lines of different colors running in circular arcs and forming by their decussation minute lozenge-shaped spaces. By this character, which is represented by every portion of any transverse section of an elephant's tusk, true ivory may be distinguished from every other kind of tooth substance and from every counterfeit, whether derived from tooth or bone. Although no other teeth, except those of the elephant, present this characteristic, many other animals, such as the walrus, narwhal, and hippopotamus, possess teeth, horns, or tusks which, from their large size and from their density, can be used for the same purpose in the arts as those for which true ivory is employed. In the case of the elephant the tusk is formed by the prolongation of the upper incisor, while the tusk of the hippopotamus and other animals is a prolonged canine. Perhaps with the ancients "ivory" was used in the broader sense, for Pliny tells us that in Ethiopia ivory was so plentiful that it was used for doorposts, fences, and cattle stalls. The ivory of the tusks of the African elephant is held in the highest estimation by the manufacturer, on account of its greater density and whiteness. The tusks are yellow or brown on the outside, but inside are snowy white. The tusks are of all sizes from a few ounces in weight to more than 100 pounds each. Russia, and especially Siberia, obtains large quantities of ivory from the tusks of fossil elephants. This product, called fossil ivory, is composed of calcium phosphate, 64; organic matter, 24; water, 11.15; calcium carbonate, 0.10. There are various chemical processes by which it may be dyed various colors, as black, blue, green, yellow, red, and violet. Ivory articles can be made flexible and semitransparent by immersion in a solution of phosphoric acid of specific gravity 1.130, till they become translucent. They are then to be taken out, washed with water, and dried with a soft cloth, when they are found to be as flexible as leather. They harden on exposure to dry air, but resume their pliancy when immersed in hot water. The opacity and elasticity of old ivory may sometimes be restored by boiling it in gelatin, but no satisfactory method for restoring its whiteness has yet been discovered.

The tusks of the elephant have from very early periods constituted an important article of trade, in consequence of their great beauty as a material for ornamental manufactures and even works of fine art. Ivory is frequently mentioned in the Old Testament. Solomon had a throne of ivory and gold. The Egyptians and Assyrians made much use of this material in ornamental work. With the Greeks it became a most important material, and by the hands of the sculptor Phidias a statue was produced of the Olympian Jupiter of such marvelous beauty and imposing majesty that it was considered a misfortune to die without having seen it. The pupils of Phidias made many of these colossal images (chryselephantine statues), the bodies being in ivory and the drapery in gold. It was also extensively used by the Romans, who were supplied from Africa, and by them its use was diffused over the whole of Europe. In fact it was through the consular diptychs or carved ivory tablets, joined by hinges, containing within a wax record on which are inscribed official names and portraits, that the traditions of classical art were passed along to more barbarous times, while later they figured in Christian art as covers of missals and reliquaries.

During the Renaissance ivory was much used for inlaid work in furniture, and the art of carving it was brought to a high state of skill. Caskets, statuettes, mirror cases, chessmen, and many other articles were made of this material. The town of Dieppe in France has had its ivory factories since the fifteenth century. At present the demand for ivory is increasing, owing to the great taste and skill of some of the artists who work in this material, and, as the supply increases but very slowly, it is likely to become very costly. The art of working in ivory doubtless had its origin in India, where it has always been a much valued material. In China and Japan, especially the former country, the decorative value of ivory is highly prized, and infinite care and patience are shown by the Chinese in his carving on this material. Piano keys supply the principal use of ivory, and unless the imitation products were drawn upon, the natural article would not suffice to meet this single demand. Ivory is difficult to cut, requiring the hardest and sharpest tools, but it is easily sawed or filed. Large plates of veneer are obtained by cutting a spiral shaving round the tusks with what is known as a reciprocating saw. It is polished with various powders. Every scrap of material is saved in the manufacture of ivory, the scraps, shavings, and dust being converted into ivory black or artists' pigments.

The tusks of the African elephant furnish at once the greatest and best parts of the ivory of commerce, and for this purpose it is estimated that annually some 70,000 elephants are killed. At the same time there are many old tusks that find their way into commerce. In addition to tusks obtained from killing elephants and those derived from various old supplies, fossil ivory derived from Siberia, China, Alaska, and elsewhere figures prominently, though statistics as to its amount are not available. African tusks sometimes reach a length of 9 feet and weigh 200 pounds or more, one pair from German East Africa weighing 459 pounds and the larger measuring 10.16 feet in length. The tusks are sold on the basis of weight. Those of the Indian elephant are smaller, averaging under 50 pounds, the largest tusks measuring not over 4 or 5 feet in length outside curve and about 16 inches in circumference at the gum and weighing about 74 pounds.

Prime ivory consists of tusks, each of more than 20 pounds' weight. Scrivelloes are tusks weighing less than 20 pounds each; ball scrivelloes are suitable for the manufacture of billiard balls; bagatelles, not large enough for the production of balls; while the other classes are hollows, cores, and defectives. Walrus teeth, an inferior class of ivory substitute, commands relatively a very low price and is derived in large amounts from Alaska. Tusks of extinct mammoths have been found 12 feet long and weighing 200 pounds. The three great ivory markets of the world are Antwerp, London, and Liverpool, the first named being since 1895 the most important, and the receipts usually exceeding those of London.

On account of the opening of the Congo Free State and the efforts of King Leopold to bring the ivory trade to Belgium, that country became the world's greatest ivory mart, and usually more ivory came to Belgium from the Congo and Angola than to England from all over the world. Not only is the amount of ivory not increasing, but it must gradually sink to nothing with the extermination of the elephant, and at the same time its uses grow, so consequently various substitutes must be employed, such as celluloid and vegetable ivory (qq.v.), the latter being a product of increasing use. The world's production of ivory fluctuates greatly.

Germany is the greatest consumer of ivory and is usually followed by India, where ivory working is considered as a religious rite, in addition to being an important industry carried on in Mysore, Travancore, Burma, in the town of Murshidabad, and in Bengal and Delhi. In 1913 India imported 243,941 pounds of unmanufactured ivory valued at $663,613, most of it from Africa, as except in Burma this product is preferred to that of India or Ceylon.

Germany imports largely from England, and in 1912, of total imports of 315.7 tons of raw ivory, 102 tons came from England. In the United States a tariff of 20 per cent imposed by the Act of 1913 on raw ivory affected the American industry. Recent imports of ivory by the three countries are indicated in the accompanying tables.

UNITED STATES IMPORTS OF ANIMAL IVORY (AND MANUFACTURE OF) IN ITS NATURAL STATE

By fiscal years ending June 30

IMPORTED FROM	1909		1910		1911		1912		1913	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Europe:										
Belgium	227,468	$597,967	208,548	$517,875	207,162	$505,433	202,448	$508,309	311,604	$817,537
France	270	1,302	176	993	....	....	....	....	....	....
Germany	36,950	111,277	15,574	40,073	16,507	40,380	26,261	74,151	42,947	141,005
Italy	....	....	....	....	....	....	....	....	14	40
Netherlands	6,200	12,617	....	....	....	....	....	....	....	....
Norway	....	....	....	....	....	....	....	....	28	84
Spain	....	....	....	....	80	352	....	....	....	....
United Kingdom:										
England	311,045	874,539	202,253	595,205	178,891	473,914	179,590	484,153	232,378	554,493
Scotland	3,275	2,330	837	596	2,375	1,469	....	....	....	....
North America:										
Canada	184	85	530	135	....	....	....	....	292	119
Greenland	....	....	....	....	550	1,100	....	....	....	....
Newfoundland and Labrador	11	25	....	....	....	....	....	....	....	....
Asia:										
Aden	23,312	71,329	32,832	115,976	17,179	49,367	23,996	70,128	8,922	26,957
Russia in Asia	16,120	11,410	17,282	9,807	14,269	7,997	12,647	6,519	27,286	13,838
Africa:										
British Africa, E.	141,891	394,619	114,444	316,608	97,187	263,543	71,131	191,702	44,449	131,889
Turkey in Africa, Egypt	....	....	....	....	....	....	2,841	6,117	54,267	135,396
Total	766,726	$2,077,500	592,476	$1,597,268	534,200	$1,343,555	518,914	$1,341,079	722,187	$1,821,358
RECAPITULATION										
Europe	585,208	$1,600,032	427,388	$1,154,742	405,015	$1,021,548	408,299	$1,066,613	586,971	$1,513,159
North America	195	110	530	135	550	1,100	....	....	292	119
Asia	39,432	82,739	50,114	125,783	31,448	57,364	36,643	76,647	36,208	40,795
Africa	141,891	394,619	114,444	316,608	97,187	263,543	73,972	197,819	98,716	267,285

As showing the range of ivory and ivory substitutes, as well as their relative cost, prices for the London sale of April 23 and 24, 1913, may be cited. Walrus teeth, good mixed sizes, brought 45 to 62 cents per pound; defectives, 8 to 27 cents per pound. Rhinoceros horns, best, ranged from $1.75 to $2.75; medium, $1.87 to

QUANTITY, VALUE, AND AVERAGE PRICE OF IVORY IMPORTED INTO THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND

	1906	1907	1908	1909	1910	1911	1912	1913
Quantities, cwt. (112 lbs.)	9855	10,787	9345	11,555	11,200	10,746	10,949	10,154
Value, £	407,843	560,552	431,894	534,066	494.398	409,653	504,039	487,698
Average price per cwt., £	41.08	51.97	46.22	46.22	44.14	46.50	46.04	48.23

GERMAN IMPORTS OF IVORY

CLASSIFICATION AND SOURCE	1911	1912
	Tons	Tons
Raw ivory, including walrus tusks:		
Total importations	310.6	315.7
From Great Britain	125.9	102.0
From British India	70.3	73.8
From Congo	38.7	73.5
From Belgium	27.8	13.2
From Kamerun	6.8	8.2
From Abyssinia	1.7	6.5
From Austria-Hungary	6.0	6.4
Ivory sheets or pieces:		
Total importations	17.9	21.3
From France	2.5	4.0
From Great Britain	8.9	10.3
Ivory in plates or pieces:		
Total importations	76.1	85.8
From France	13.7	11.4
From Great Britain	62.6	74.2

$2.18; short, mixed, 87 cents to $1.31 per pound. Sea-horse teeth, mixed, curved, straight, fair, and cracked, 12 to 31 cents; bears' tusks, 11 to 17 cents per pound. Zanzibar, Abyssinian, and East Indian teeth and scrivelloes, per hundredweight (112 pounds), ranged from $403.91 to $428.25 for sound tusks weighing on the average 80 pounds and over, to $194.66 to $199.52 for soft defective tusks of from 3 to 5 pounds. Egyptian and Malta teeth and scrivelloes brought, per hundredweight, $389.32 to $408.78 for soft sound tusks of 80 pounds and over, down to $214.12 for average-weight tusks of from 3 to 5 pounds. Gabun, Congo, Niger, and other West African teeth and scrivelloes brought, per hundredweight, for sound tusks averaging 70 pounds or over, $296.85 to $330.92, while several tusks averaging from 3 to 5 pounds brought from $107.06 to $111.92. Consult Maskell, *Ivories* (New York, 1905). See ELEPHANT; VEGETABLE IVORY.

IVORY, SIR JAMES (1765–1842). A Scottish mathematician, born at Dundee and educated at the University of St. Andrews, where he exhibited special proficiency in mathematics and graduated M.A. in 1784. In 1786, after further study at Edinburgh, he abandoned the theological career for which he was preparing, taught in the Dundee Academy for three years, and from 1789 to 1804 engaged in commercial pursuits as manager and partner of a flax-spinning mill. In his leisure hours, however, he continued his mathematical studies; became known by learned contributions to the Royal Society of Edinburgh; and in 1804 received the appointment of professor of mathematics in the Royal Military College, then at Marlow, Buckinghamshire. He retired in 1819 on a pension which was augmented in 1831, when he was knighted. His essays and memoirs, published from 1796 to 1842, in the *Transactions* of the Royal Societies of Edinburgh and London, evince remarkable and acute analytical power. His resolution of the attractions of ellipsoids, enunciated in 1809, has been known ever since as "Ivory's theorem." In 1814 he received the Copley medal from the Royal Society for "a new method of determining a comet's orbit"; in 1826 the Royal medal for a paper on refractions, which was eulogized by Laplace for its masterly analysis; and again in 1839 the Royal medal for his "Theory of Astronomical Refractions." He was elected to honorary membership in several learned societies of Great Britain and other lands.

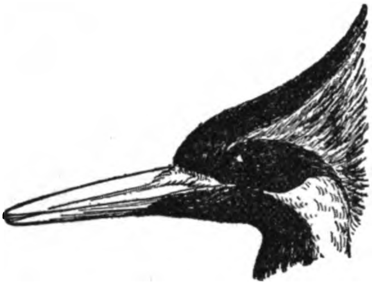
IVORY, VEGETABLE. The fruit of a handsome palm, *Phytelephas macrocarpa,* which grows in the Peruvian Andes, on the banks of the river Magdalena, and in other parts of South America. The stem is short and procumbent, but from its crown is developed a magnificent tuft of light-green pinnated leaves, which rise like immense ostrich feathers to a height of from 30 to 40 feet. The flowers are on a crowded spadix and have neither calyx nor corolla. The fruit, which is as large as a man's head, consists of six or more four-celled aggregated drupes and contains numerous somewhat triangular nuts as large as a hen's egg. The kernels of these nuts, called *corrozo* nuts in commerce, are so hard and white, and resemble ivory so greatly, that the name "vegetable ivory" is particularly applicable. They have of late come into extensive use with turners in the manufacture of buttons, umbrella handles, and small trinkets.

THE IVORY-NUT PALM.

a, NUTS IN HUSK; *b*, A SHELLED NUT.

The imports into the United States in 1913 were 29,206,278 pounds valued at $977,525. See also ATTALEA; COQUILLA NUT.

I'VORYBILL'. The great Southern woodpecker (*Campephilus principalis*), now confined to the cypress swamps of the Gulf States and nearly extinct. It is one of the largest of the tribe and so impressed Linné by its size (length, 20 inches) and grandeur that he called it "prince." Its plumage is glossy black, with the secondaries and shorter primaries pure white, and a white stripe down each side of the neck and along the scapulars, meeting in the middle of the back. The long crest of the male is scarlet, but that of the female is bluish black; the bill is ivory yellow, straight, and chisel-like, capable of drilling holes in hard wood and reaching the deeply buried grubs upon which it mainly feeds. This fine species was formerly a resident from the Potomac and Ohio rivers southward, and the early ornithologists have much to say of it. Audubon says its food included grapes, and that its nest was a hole, like that of other woodpeckers, dug by the alternate labor of both mates, always in a living tree. He remarks its graceful flight—the bird seems merely to swing itself from the top of one tree to that of another in an elegantly curved line—and describes its notes as clear, loud, yet very plaintive. These birds were never very numerous, since they were constantly killed by the Indians, who valued highly their heads as ornaments and as symbols of dignity and courage. The frontiersmen, with barbaric love of color, copied the custom and adorned their shot pouches and caps with the gaudy crests, and ignorant Southern farmers killed them and all woodpeckers under the mistaken notion that they were destroying the forest trees.


HEAD OF IVORYBILL.

IVORY CARVING. Under this head must be included sculpture in bone, in vegetable, in walrus or narwhal ivory, and in fossil ivory, as well as that carved in the ivory of the elephant. It is therefore the whole subject of delicate and minute ornamental carving, except as done in wood and in fine hard stones. At all ages of artistic development it seems to have been practiced. The earliest specimens, chiefly from the Dordogne in France, are the work of cave dwellers and date from the time when the mammoth and the reindeer roved in southern Europe. They show considerable artistic skill, manifested in a restrained realism and an astonishing comprehension of life and movement.

Ancient Ivories. The earliest Egyptian ivories go back at least to the first and second dynasties (3400–2980 B.C.). In later Egyptian tombs there have been found statuettes, handles of weapons, boxes, and the like, very delicately sculptured; and others have been found in Nineveh, especially tablets, now in the British Museum, carved with significant figures in low relief, dating from the tenth century B.C. The Greeks used ivory for a great variety of decorative purposes; but its most famous use in antiquity was in connection with the chryselephantine (q.v.) statues, which were the most magnificent and sacred in Greece. Among the many uses which the Romans, particularly during the late Imperial times, made of carved ivories, the most important was the consular diptychs, tablets of ivory given by the consuls as mementos to their patrons and friends. A number of private diptychs, some of fine artistic quality, also survive. The luxury of the later Empire, particularly in the East, made use of carved ivory as panels for doors, in chairs, etc. The dwellings of the wealthy were filled with furniture of ivory and silver.

Byzantine Ivories. It was in fact in the Eastern Empire that ivory carving attained its most perfect development, especially in connection with ecclesiastical usage. The history of sculpture from the fourth to the eighth century can best be studied by means of these small but highly finished works. The diptych was developed into the wonderful carved book covers which adorn many ancient manuscripts and into devotional tablets with interior instead of exterior carvings. Ivory was also used for pyxes, shrines, crosiers, crucifixes, panels to ornament doors, seats, especially thrones, like that of Archbishop Maximianus in the cathedral of Ravenna. The earliest period of Byzantine ivories closed with the iconoclastic movement (726–842 A.D.). At this time secular ivories became the rule: caskets, of which there is a fine ninth-century example in the Victoria and Albert Museum, London; delicately carved hunting or drinking horns, called oliphants, and usually showing Oriental influence; mirrors, combs, seals, chessmen, and a variety of other objects. The Macedonian and Comnenian periods (from 842 till the sack of Constantinople by the Crusaders, 1204) form a second golden age of Byzantine ivories, of which a fine example is the triptych d'Harbaville in the Louvre. Even the last period of Byzantine art, terminating with the capture of Constantinople by the Turk in 1453, produced works of great excellence. Throughout its career Byzantine ivory carving was imitated by the craftsmen of the West, and this lasted until the advent of the Gothic period. This is true of the Carlovingian Renaissance (ninth century) in Germany and France, which produced fine book covers, and of German ivory carving in the time of the Ottos (tenth century). During this period and even in the eleventh century ivory carving was the most important form of sculpture, and was often determinative for the stone sculpture, particularly of the façades of Romanesque cathedrals in southern France. But with the revival of sculpture in stone during the late Romanesque epoch ivories gradually began to lose their unique importance, and from about the close of the twelfth century they in turn become subordinate to sculpture in stone.

Gothic Ivories. In the mighty revival of all art during the Gothic epoch ivory carving had an important share, rivaling in its achievements the Byzantine epoch. All the objects of ecclesiastical use mentioned above, and others besides, were produced in great numbers. Diptychs, and especially the more popular triptychs, were marvels of minute workmanship or of delicate openwork and traceries. The most popular subject, however, was the Virgin and Child, of which numerous specimens survive in all the principal collections. One of the finest known of ivory carvings is a Madonna of unusual size, gilded and tinted, in the little church of Villeneuve-les-Avignon. During the fourteenth century secular ivories were increasingly produced—elaborate mirror cases, caskets carved with scenes from the mediæval romances, plaques for thrones, like the delicately carved fragment of the throne of Jayme I, King of Aragon and Minorca, in the Morgan collection (Metropolitan Museum, New York). Practically all Gothic ivories, like the Byzantine before them, were polychrome, producing a rich, enamel-like effect. France, and in especial Paris, was the great centre, till the close of the fourteenth century, when Burgundy rose into prominence. Germany and England, much less productive, were influenced by French models; southern Europe was comparatively inactive, except that in Italy, at the close of the fourteenth century, fine altars and caskets were carved of bone, and in Spain the Moors carved caskets and other objects of great beauty.

Modern Ivories. Although a few fine examples were produced during the later fifteenth and sixteenth centuries, ivory carving gradually sank into disuse. But during the baroque period it was again abundantly practiced, especially in Germany and the Netherlands. Of particular interest are the rich and elaborate German tankards, to be seen in all museums; while in Flanders the infant bacchanals of Francis Duquesnoy achieved a wide reputation. During the eighteenth century France, where an important school was established at Dieppe, again took the lead, but by c.1750 the art ceased to attract men of talent. The school of Dieppe continued a desultory activity; and in the early nineteenth century James Pradier (q.v.), among other sculptors, carved many figures in ivory. But the real revival came about 1890 in connection with the goldsmith's art; for the rich mellow tint of ivory lends itself admirably to combination with the nobler metals and with precious stones. "Objets d'art," as such sculptures are generally called, were first introduced and have been designed most of all in Paris, where prominent artists like Vever, J. Dampt, Théodore Rivière, and especially Lalique, have made a specialty of them. In Belgium, also, the acquisition of the Congo territory by King Leopold II, who offered important medals for carving the ivory it produced, led to an important revival, in which artists like Constantin Meunier, van der Stappen, Hosemans, and Rombeaux participated. The Belgian expositions and the activity of local centres and schools gave an impetus to the art in Germany, where the sculptor Lewin-Funcke deserves especial mention. In the recent revival of decorative art in Great Britain ivory carving also played a part. Its most notable use, however, has been in the polychromatic sculpture of great artists like George Frampton and Alfred Gilbert.

The Orient. In India the art of ivory carving has been practiced from earliest times. The innumerable figurines of the Hindu pantheon have little besides a decorative interest; but beautiful caskets and similar objects were made in the south. On the east coast of India the inhabitants of Goa and other Portuguese possessions produced interesting hybrid wares for the European market. All the Saracenic peoples made use of the ivory, especially in their remarkable inlay work. But by far the best known and the most valuable Oriental ivories are those of China and Japan. Japanese art seems indeed to have followed its strong predilection for minuteness in undertaking the artistic treatment of very small masses of these hard materials. The little netsukes (see NETSUKE) are more often of ivory than of any other substance, and their almost infinite variety and their spirited character are well known. Less known are the highly wrought boxes carved with reliefs, both high and low, and adorned with little figures in the round which serve as knobs for the cover or the feet of the piece.

Important Collections. Among the museums richest in ivories are those of Vienna, Berlin, Dresden, and Munich; the Musée de Cluny and the Louvre, Paris; the Victoria and Albert Museum and the British Museum, London; the municipal museums of Bologna, Brescia, Milan, and Ravenna; the Museo Nationale, Florence; the Museo Kircheriano, Rome; and the Museo Cristiano of the Vatican. The treasuries of certain cathedrals like Milan, Monza, Ravenna, possess rich specimens of the art. Ivory book covers are generally preserved, often along with other ivories, in the important libraries, such as the British Museum, the Bibliothèque Nationale, Paris, the Royal libraries of Berlin and Munich, at Saint-Gall, and especially in the Vatican. The most important collections in the United States are those of the late George A. Hearn and J. P. Morgan, the latter (on exhibition in the Metropolitan Museum, New York) one of the most important and representative in existence.

Bibliography. The best general account of the diverse and scattered aspects of this subject is by Emile Molinier, *Histoire générale des arts appliqué à l'industrie*, vol. i (Paris, 1896). The most complete English manual is Alfred Maskell, *Ivories* (London, 1905), which contains a full bibliography and many photographic reproductions of noted pieces, including a discussion of consular diptychs. Indispensable to a thorough study of the subject are the important researches and photographic publications of Dr. Hans Graeven, published, as well as elsewhere, in *Jahrbuch der kunsthistorischen Sammlungen des allerhöchsten Kaiserhauses*, vols. xx, xxi (Vienna, 1899–1900); id., *Frühchristliche und mittelalterliche Elfenbeinwerke in photographischer Nachbildung* (Rome, 1898–1900); G. C. Dutt, *Monograph on Ivory Carving in Bengal* (Calcutta, 1901). The best work on the antique period is also by Hans Graeven, *Antike Schnitzereien in Elfenbein und Knochen* (1st series, Hanover, 1903). For mediæval ivories, consult: William Maskell, *Ivories, Ancient and Mediæval* (New York, 1876); A. M. Cust, *Ivory Workers of the Middle Ages* (London, 1902); O. M. Dalton, *Byzantine Art and Archæology* (Oxford, 1911). For the Renaissance and modern: Scherer, *Elfenbeinplastik seit der Renaissance* (Leipzig, 1903). The catalogues of the ivories of the great collections are valuable by reason of good introductory sketches as well as descriptions; such as those of the Berlin Museum by Vöge (Berlin, 1900), the Hearn collection (New York, 1908), the British Museum by Dalton (London, 1909), the Hoentschel (now J. P. Morgan) collection by Pératé (Paris, 1911), and those of the Metropolitan Museum of Art, New York.

IVORY COAST (Fr. *Côte d'Ivoire*). A colony constituting a part of the Government-General of French West Africa, bounded on the north by the French Colony of Upper Senegal and Niger, on the east by the British Colony of the

Gold Coast, on the south by the Gulf of Guinea, and on the west by Liberia and the Colony of French Guinea (Map: Africa, D 4). The boundary with Upper Senegal and Niger varies from about 9° 30′ N. to about 10° 40′ N., the western part extending farther north than the eastern. The most southerly portion is at the western limit of the coast, about 4° 20′ N. On the northeast the boundary is formed by the Black Volta River; the southern part of the western boundary, by the Cavally River. The coast line is about 380 miles in length. The area of the colony is estimated at 325,200 square kilometers (125,560 square miles). The coastal strip, averaging about 35 miles in width, is flat and contains the well-known lagoons, which for the most part are navigable. Beginning on the east, these lagoons are: Aby (sometimes called Assinie), Tendo, Frambo, and Assinie (properly so called); Ebrié (called also Grand-Bassam), which is about 90 miles long and has branches known as Lagoon Potou and Lagoon Ono—on it are situated the towns of Grand-Bassam, Bingerville, Abidjan, Dabou, and Jacqueville; Lahou, north of the port of Grand-Lahou; and Fresco. The rivers are not of very great commercial importance, though there is some navigation on the Comoë, Bandama, Bia, Sassandra, and Cavally. North of the low-lying coastal strip the land rises, but no great elevations are found except in the west. Here a range about 30 miles in length, with an east-and-west direction, culminates near Nzô in Mount Nimba, on the boundary with French Guinea a little north of the Liberian line. Nimba has an altitude of 1644 meters (5393 feet) and is the highest mountain of French West Africa. South of this range, between the deep valleys of the Sassandra and Cavally, is a second mountainous region, where the highest peak reaches about 1400 meters (about 4600 feet). The colony is notable for its vast and dense forest, which has been its chief material resource and at the same time the most formidable obstacle to exploration and development. In extent the forest is not quite so great as was formerly believed. Beginning near the shore of the sea or the lagoons, it extends in the west to 8° N. and in the east to about 7° 30′ N., while in the centre of the colony it is indented by a large area between the N'zi and Bandama rivers (which are confluents). North of the forest region wooded areas may still be found, especially along the streams; but there are large savannas, where grazing and agriculture are somewhat developed. This Sudanese region is too remote from centres of communication to attract the enterprise of whites, but it holds out fair promise to native development.

The climate is generally hot and, at least in the coastal and forest regions, unhealthful. Rains are excessive (they are more frequent in the forest than on the coast), and the humidity is always great. There are four seasons: the main dry season (with a mean temperature of over 82° F.), from mid-December to mid-April; the main wet season, from mid-April to mid-July; the short dry season, from mid-July to September; the minor season of rains, from September to mid-December.

The colony produces mahogany and other woods, palm kernels, palm oil, rubber, manioc, and ground nuts; some corn and rice are cultivated by the natives. Imports and exports (general commerce) amounted to 7,619,000 and 8,052,000 francs respectively in 1900; in 1905, 13,895,000 and 7,636,000; in 1910, 16,049,000 and 15,750,000; in 1911, 20,567,000 and 18,249,000; in 1912, 17,534,000 and 17,616,000. In 1912 imports from France were valued at 6,316,000 francs, and from the United Kingdom, 7,200,000 francs; exports to France, 6,853,000 francs, and to foreign countries 10,763,000 francs. The chief imports in 1912 were: cotton tissues, 4,642,000 francs; rice, 1,111,000 francs; machinery and iron manufactures, 1,058,000 francs; distilled liquors, 942,000 francs. The principal exports are palm oil and rubber, while palm nuts and mahogany are important. The chief ports are Grand-Bassam, Grand-Lahou, and Assinie.

A railway is projected to extend through the colony from south to north. It starts from Abidjan on the north shore of Lagune Ebrié and passes through Dimbokro (183 kilometers), near the confluence of the N'zi and Bandama; in September, 1912, it was opened to traffic as far as Bouaké in the centre of the colony, 316 kilometers (196 miles) from Abidjan. Telegraph lines connect the principal towns and extend to adjoining colonies.

The colony is divided into 17 circles. It is administered by a Lieutenant Governor, under the Governor-General of French West Africa. The capital is Bingerville. The budget for 1914 showed an estimated revenue and expenditure of 7,265,000 and 6,093,000 francs respectively.

The population of the Ivory Coast was estimated in 1911 at 1,132,941. For 1913, the indigenous population is reported at 1,416,043, divided as follows: Agni, 357,212; Senoufo, Dioula, and Malinki, 334,932; Bete, Gouro, Dan, and races of the upper Cavally, 312,608; Attiè, Abbey, and other races of the lagoons, 62,386; Krumen, 19,056; Ashanti-Fanti, 3098; various races, 332,751. Of the total, 1,329,568 were returned as fetishists, 79,334 as Mohammedans, 4139 as Protestants, and 3002 as Roman Catholics. The Agni, who comprise some 15 tribes (including the Baule), are allied ethnologically to the Ashanti and inhabit, roughly speaking, the southeastern quarter of the colony. They probably came from the north of the present Gold Coast Colony about 1730. They are fetishists; their society is patriarchal and admits polygamy. The Dioula and Senoufo are comprised in a group known as Mande. The Dioula, a conquering race, are Mohammedans; the Senoufo, probably autochthonous, are fetishists. The various races of the lagoons, some of whom are related to the Ashanti, are in a state of savagery, being much inferior to the Agni or the Mohammedans of the north. The inhabitants of the southwest quarter of the colony, the Krumen, Bete, Gouro, etc., are in a low state of civilization. The Ivory Coast has no large towns. In 1913 Grand-Lahou had a population of 3050 indigenes and 78 Europeans; Grand-Bassam, 2832 and 164; Tiassalé, 1548 and 17; Aboisso, 1241 and 38; Assinie, 1135 and 38; Bingerville, 780 and 38; Abidjan, 613 and 110.

The French occupation of the Ivory Coast dates from 1842, when treaties were concluded placing the inhabitants about the Lagune Ebrié under the protection of France. In 1850 factories were established at Grand-Bassam and Assinie, and two years later a fort was erected at Dabou. The factories were abandoned in 1871. In 1878 a French Resident was appointed, but the hold of France on the country was slight until 1893; in that year, as a result of the explorations of Binger and Treich-Laplene in the eighties and of Marchand in 1892, a decree was issued organizing the Colony of the Ivory Coast. With the subjugation of Samory's kingdom in the northwest, which began in 1893 and ended with the capture of Samory in 1898, French authority became paramount. Subsequently assassinations of French officials were not infrequent, and in 1910 the Abbey revolted; but French supremacy is practically established throughout the country. Consult: Binger, *Du Niger au Golfe de Guinée par le pays de Kong et le Mossi, 1887–1889* (2 vols., Paris, 1892); Clozel and Villamur, *Les coutumes indigènes de la Côte d'Ivoire* (ib., 1902); Maurice Delafosse, *Les frontiers de la Côte d'Ivoire, de la Côte d'Or, et du Soudan* (ib., 1908); official monograph, *Côte d'Ivoire* (ib., 1908); Sonolet, "Lettres d'Afrique Occidentale," in *Journal des Debats* (ib., 1909–11); F. Lambert, "La Côte d'Ivoire," in Société de Géographie d'Alger et de l'Afrique du Nord, *Bulletin*, vol. xvii (Algiers, 1912).

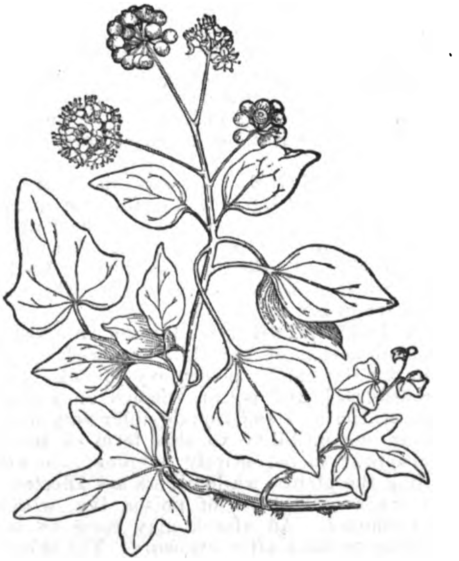
IVORY SHELL. A gastropod of the genus *Eburna*, so called from its white, solid, smooth shell. The epidermis is usually wanting. The white shell is sometimes spotted with dark red, and the animal is spotted like the shell. The species inhabit the Red Sea and Indian Ocean, as well as the coasts of the Cape of Good Hope, Japan, China, and Australia.

IVREA, ē-vrā'ȧ. An episcopal city in the Province of Turin, Italy, 38 miles north-northeast by rail of the city of Turin, on the left bank of the Dora Baltea, which is crossed here by a Roman bridge (Map: Italy, A 2). It has an extensive castle (now used as a prison), a tenth-century cathedral, a ruined abbey, a lyceum, and a town hall. Its educational institutions include a Gymnasium, a technical school, and a theological school. Ivrea markets wine, grain, and fruit, spins silk and weaves cotton, and has ironworks and dye works. On this site stood the ancient town of Eporedia, a place of importance because of its position at the junction of various roads; there were gold mines, too, near by. It was colonized by the Romans in 100 B.C. to command the roads over the Great and Little St. Bernard. The town of Ivrea was the capital of the Margraviate of Ivrea which Charlemagne substituted for the Lombard Duchy. The margraves of Ivrea, Berengar II, his son, Adalbert II, and Arduin of Ivrea, were raised to the Italian throne. The last was finally obliged to yield before Henry II, who in 1019 annexed the margraviate to the Empire. In 1248 Ivrea was given as a fief to Count Thomas of Savoy, to whose posterity it descended. The French captured the town in 1554, 1641, and 1704. From 1800 to 1814 it was the capital of the French Department of Doire (Ital., Dora). Pop. (commune), 1901, 11,696; 1911, 11,330. Consult Baedeker, *Northern Italy* (14th Eng. ed., Leipzig, 1913).

IVRY-LA-BATAILLE, ē'vrē'-lȧ-bȧ'tī'y'. A village of France in the Department of Eure, on the river Eure, 40 miles west of Paris. Though it has a ruined abbey, and manufactures of musical instruments, combs, and leather goods, its chief interest is as the scene of the great victory of Henry IV of Navarre, March 14, 1590, over the Duke of Mayenne. The battle has been commemorated by an obelisk as well as a poem by Macaulay. Pop., 1901, 1034; 1911, 1190.

IVRY-SUR-SEINE, sụr-sân'. A manufacturing town in the Department of Seine, France, on the left bank of the Seine River, 1 mile south-southeast of the fortifications of Paris (Map: Paris and Vicinity). Its forts form part of the defenses of the capital. It has increased rapidly in industrial importance. Here are located the great workshops of the Orléans Railroad; and there are manufactures of machinery, pottery, organs, wall paper, and rubber. Much garden truck is produced. Its principal manufactures are musical instruments, soap, and chemical products. Pop., 1901, 28,585; 1911, 35,445.

IVY (AS. *ifig*, OHG. *ebarvi, ebah, ebahewi*, Ger. *Epheu*, of uncertain origin). A name applied to a number of climbing, creeping, and trailing plants, among them the English or common ivy, Boston or Japanese ivy, Virginia creeper, ground ivy, and poison ivy. The common or English ivy (*Hedera helix*) is a well-known native of Europe, rare in the northern countries, which has been extensively introduced into the eastern United States between latitudes 30° and 40°. Its long, creeping, branched stem, which climbs on trees and walls to a great height and closely adheres to even very hard substances by means of abundant rootlets which it develops along its whole length, acquires in very aged plants the thickness of several inches. Its five-lobed, shining, stalked, evergreen leaves, clothing bare walls with green luxuriance, serve to throw off rain, and the rootlets of the stem extract moisture from the walls to which they cling, contrary to a common prejudice that ivy tends to produce dampness in walls. The flowering branches of ivy have ovate, entire leaves, very different from the others. Its small greenish flowers are produced in the beginning of winter, and the small black berries are ripened in the following year. The berries are eagerly eaten by many birds, although they have a pungent taste and contain a peculiar bitter principle called hederin and an acid called hederic acid, which are also found in a gummy exudation obtained by incisions from the stem and occasionally used in varnish mak-



COMMON OR ENGLISH IVY.

ing and in medicine as a depilatory and a stimulant. In Egypt the ivy was sacred to Osiris, in Greece to Bacchus (Dionysus), whose thyrsus was represented as surrounded with ivy; the Romans mingled it in the laurel crowns of their poets.

Several of the 60 or more horticultural varieties of ivy are planted for ornamental purposes, of which that generally known in Great Britain as Irish ivy and on the European continent as English ivy is particularly esteemed for its large leaves and luxuriant growth. The Boston or Japanese ivy (*Psedera tricuspidata*) and the Virginia creeper (*Psedera quinquefolia* or *Ampelopsis quinquefolia*) belong to the same family as the grape. They are shrubby, hardy ornamental climbers, cling by tendrils opposite the leaves, and are especially attractive in their autumnal coloration. The Boston ivy has three-lobed or trifoliate leaves, the Virginia creeper five leaflets upon rather long petioles. The Boston ivy clings closely to walls, is of rapid growth, and is one of the best hardy vines for city growing. Both the common and Boston ivy grow readily from cuttings. The ground ivy (*Nepeta glechoma*) is a plant of the mint family that trails over the ground. The poison ivy or poison oak (*Rhus toxicodendron*) somewhat resembles the Virginia creeper in the appearance of its leaves and is sometimes mistaken for it. Its leaflets, however, are three in number and are not palmately arranged upon a common leafstalk. This plant possesses an irritant poison, and bathing the affected parts in an alcoholic solution of lead acetate is highly recommended as a remedy. The German ivy (*Gynoxys cordifolia*, or *Senecio mikanioides*) is a plant belonging to the family Compositæ. The Kenilworth ivy is *Linaria cymbalaria*. The name "ivy" is also applied in the southeastern United States to *Kalmia latifolia*, an evergreen shrub.

IVY GERANIUM. See PELARGONIUM.

IVY LANE CLUB. A club founded in 1749 by Dr. Johnson. Its meetings were held at the King's Head, in Ivy Lane, London. See CLUB.

IVY OWL. A fanciful name for the English tawny owl (*Syrium*, or *Strix, aluco*), which frequents ivy-grown ruins. See OWL.

IVY POISONING (DERMATITIS VENENATA). An inflammation of the skin produced by poisonous plants, chiefly poison ivy or oak (*Rhus toxicodendron*) and poison sumach or dogwood (*Rhus venenata*). Individuals differ very widely in their susceptibility to this form of poison. Some appear to be entirely immune even after handling the plants, while others are affected by the mere neighborhood of poison ivy, without actual contact. An attack may come on in a few hours or days after exposure. The skin becomes red and swollen, innumerable vesicles and blebs then appear, and there is severe burning, tingling, or itching. The eruption is carried to other parts of the body by auto-inoculation. The disease lasts from one to four weeks. Treatment consists in the application of mildly astringent and sedative lotions; hyposulphite of sodium, boric acid, fluid extract of grindelia robusta, and zinc, being favorite remedies. When large areas of the body are affected, alkaline baths are grateful. See IVY.

IWÁKURA, ē-wä'kōō-rȧ, TOMOMI, PRINCE (1835–83). A Japanese statesman, born in Kyoto, of one of the illustrious families of the great Minamoto (q.v.) clan. He became a chamberlain in the Imperial household of the Mikado Komei (1847–66), father of the late Emperor, Meiji Tenno (q.v.). He was one of the 88 out of the total number of 136 kugé, or court nobles, who opposed the opening of the ports to foreign commerce. In the ebb and flow of the troubled politics of the time Iwákura fell into disgrace and was banished. Later he became the agent and firm ally of the revolutionary leaders, and was the means of carrying through the palace revolution of January, 1868, by which the men in the progressive party got possession of the person of the Emperor and reconstructed the government. In this Iwákura became one of the highest officers, and thenceforth one of the chief progressive leaders of the Empire, carrying through the abolition of the feudal system with vigor and wisdom. He never saw a foreigner until middle life; yet as Minister of Foreign Affairs he proved himself a match for the foreign envoys, and in 1872 led the great embassy to the treaty powers of the world to secure if possible some modification of the treaties with them. On his return he opposed the proposed war with Korea, and carried through the measure which commuted the hereditary pensions of the samurai (q.v.), by which the Treasury was relieved of heavy financial burdens and the nation enabled to enter upon a new phase of development. On the night of Jan. 14, 1873, an attempt was made by nine assassins to kill him, but he escaped. He remained the Mikado's chief councilor until his death. His son, Prince Iwákura Tomosada, became one of the chief officers of the court.

IWAO, OYAMA. See OYAMA, IWAO.

IWEIN, ē'wān. 1. A knight of Arthur's Round Table, whose story was used in the twelfth century by Chrestien de Troyes in his *Chevalier au Lion*. 2. The most important and complete work of Hartmann von Aue. It is an independent and free adaptation of Chrestien de Troyes's *Chevalier au Lion*. Consult Chrestien de Troyes, *Sämtliche Werke*, edited by W. Foerster (Halle, 1884–99).

I. W. W. See INDUSTRIAL WORKERS OF THE WORLD.

IXI'ON (Lat., from Gk. 'Ιξίων). In Greek legend, a king of the Lapithæ (q.v.). He married Dia, the daughter of Deïoneus, and later by treachery caused the death of his father-in-law. When no one would purify him from the murder, he prayed to Zeus, who pardoned him, invited him to his table, and gave him immortality. Intoxicated by the nectar, he sought to seduce Hera, but was deceived by a cloud in her image, and by this became father of the centaurs (q.v.). As a punishment, he was fastened by serpent bonds to a fiery wheel perpetually rolling through the air. Later writers transferred the scene of his punishment to Tartarus. The story is later than the Homeric and Hesiodic poetry.

IXTACCIHUATL. See IZTACCIHUATL.

IXTAPALAPA, ē'stȧ-pȧ-lä'pȧ. A suburb of Mexico City (Map: Mexico, D 9). It was an important place at the time of the conquest by Cortés. Pop., about 5000.

IXTLILXOCHITL II, ēst-lēl'sō-chē't'l (c.1500–c.1529). A chief of the Tezcucans, the most civilized among the primitive races of Mexico. Ixtlilxochitl was the son of the famous King Netzahualpilli, and at his father's death (1516) he disputed the right of his elder brother to the throne, seeking help to establish himself as King (1520) from the Spaniards, who had arrived to begin their career of conquest. He supported them throughout, thus gaining the hatred of other native princes, of his kindred, the Aztecs, and even of his own people.

IXTLILXOCHITL, Fernando de Alba (c.1568–c.1648). A Mexican historian. He was a grandson of the last native chief or King of the Tezcuco tribe and of his principal wife, who was a daughter of Cuitlahuatzin, the successor of Montezuma. After graduating at the College of the Holy Cross (Santa Cruz) at Tlaltelolco, he was appointed interpreter to the viceregal court for trying native cases, a position in which he was able to render great assistance to the former subjects of his family. His birth and position enabled him to gather a great amount of invaluable information relating to the past history of the two native peoples from whom he was descended. He mastered the hieroglyphics of Anahuac, made large collections of manuscripts, familiarized himself with the traditions and folklore of the country, and drew his information in some instances from those who had come into contact with the *Conquistadores*. All these data he carefully preserved in his numerous *Relaciones históricas*, which to a large extent are repetitions and condensations of each other. The *Historia Chichimeca* is the most important of his writings and was completed in 1616. His works, edited by Señor Alfredo Chavero, were published by the Mexican government, *Obras de Ixtlilxochitl*, vol. i, *Relaciones*, vol. ii, *Historia Chichimeca* (2 vols., Mexico, 1891–92); but in manuscript form they were used by Prescott in his *Conquest of Mexico*. Furthermore, the *Historia* had appeared twice before the aforesaid edition by the Mexican government, and the *Relaciones* once: *Voyages, relations, et mémoires originaux pour servir à l'histoire de la découverte de l'Amérique, publiés pour la première fois en français par H. Ternaux-Compans* (trans. from the Spanish manuscript and containing only the *Historia*, 2 vols., Paris, 1840); and Edward King, Viscount Kingsborough, *Antiquities of Mexico* (9 vols., London, 1830–48; vol. ix, pp. 197–468 containing the Spanish text of the *Historia* and of the *Relaciones*).

IYEMITSU TOKUGAWA, ē-yä'mĭt'sụ tō'-kōō-gä'wȧ (1604–51). A Japanese statesman of the seventeenth century, grandson of Iyeyasu, the founder of the Tokugawa line of shoguns. He succeeded to the title in 1624 and proved himself the ablest, after Iyeyasu, of the 15 shoguns of the line. He continued, and completed in 1638–41, the policy of his grandfather in excluding all foreign influences, not only expelling all foreigners and eradicating every trace of Christianity, but also forbidding all natives, under penalty of death, to leave the country; and, the better to secure this end, he ordered the destruction of all seagoing vessels. The Dutch were confined to the little artificial island of Deshima in Nagasaki harbor, and their intercourse with the outer world was limited to two ships a year. The English had already retired from Hirado. The persecution of the Christians was fierce and bloody, and, in 1638, 37,000 of them were hurled from the precipitous cliffs of Pappenberg near Nagasaki, and hundreds more were tortured to death. He rebuilt and greatly enlarged Yeddo and erected the gorgeous shrines at Nikko, where he lies beside his illustrious grandfather. Consult W. E. Griffis, *The Mikado's Empire* (11th ed., New York, 1906).

IYEYASŪ (or IEYASŪ) TOKUGAWA, ē-yä'yȧ-s' tō'kōō-gä'wȧ (1542–1616). A famous Japanese general and statesman, the first shogun of the Tokugawa line, and the founder of the peace and order under which the Japanese lived from the year 1604 to 1868. Though a descendant of the famous Minamoto clan, his father was a humble peasant. He served with distinction under both Nobunaga and Hideyoshi (qq.v.). On the death of Hideyoshi, in 1598, great dissensions arose among the territorial barons or daimyos in regard to his successor. Many, including Iyeyasu, had sworn to protect Hideyoshi's son Hideyori, then a child of six, and to secure his succession; but many more opposed his claim as the son of a person of low birth, and sided with Iyeyasu when a movement against him compelled him to take up arms. In a bloody battle at Sekigahara, on Oct. 16, 1600, Iyeyasu utterly routed his enemies, killing 10,000 of them. Wholesale confiscations followed, and with these lands he rewarded his adherents in such a way as to secure his own authority throughout the country. Later he captured the castle at Osaka, where the child Hideyori was with his mother, and in 1603 reported to the Mikado, receiving from him the appointment of head of the Minamoto clan, and that of Seii-Taishogun (or Barbarian-quelling-great-general). Not long after he received the submission and homage of the barons at Yeddo, which he made his capital. The better to maintain his authority, he ordained that each of the daimyos should, with a certain number of his armed retainers, remain in Yeddo six months of the year, and their wives and families should be left as hostages when they visited their own domains. He then began extensive internal improvements; he enlarged the castle at Yeddo, made streets and canals, built bridges, erected buildings, drained marshes, constructed the great highway called Tokaido, which runs along the eastern coast from Yeddo to Kyoto, and effected many other great and lasting improvements for the betterment of the country. In 1605 he concluded peace with Korea, reëstablished friendly relations with China, and retired in favor of his son Hidetada, reserving to himself, however, a large measure of control. He then took up his abode in his castle at Sumpu (now Shidzuoka), in the Province of Suruga, occupying himself with the collection of books and manuscripts, and the composition (as is believed) of the document, in 100 sections, known as *The Legacy* (or Testament) of Iyeyasu, containing laws or rules to be observed in governing the country. His policy, which aimed at the unification of the country, included as one of its features the exclusion of aliens and the alien religion, Christianity. In 1614 he issued a proclamation ordering all Romish propagandists and leaders of churches to be deported, their churches to be destroyed, and compulsory recantation of the faith by the converts. Large numbers were deported, and thousands were massacred in the persecutions that followed. The Portuguese and Spanish were expelled, but the Dutch and English, who first arrived in Japan during this period, received commercial privileges—the former being allowed to settle at Nagasaki and the latter at Hirado.

Iyeyasu died at Sumpu and was buried at Kunosan in Suruga, but later his remains were interred in a mausoleum at Nikko. He was canonized as To Sho Dai-Gongen, but is commonly spoken of as Gongen Sama. His festival falls on the 17th day of the fourth month. Consult: Lowder, *The Legacy of Iyeyasu* (Yokohama, 1874); Grigsby, in the *Transactions of the Asiatic Society of Japan*, vol. viii (Tokyo, 1875); J. J. Rein, *Japan: Travels and Researches* (London, 1884).

IZABAL, ē'sȧ-bäl'. Capital of the Department of Izabal, Guatemala, situated in a mountainous but very fertile district on the south shore of Lake Izabal (or Golfo Dulce), which is connected with the Caribbean Sea by the Río Dulce (Map: Central America, C 3). The river is not navigable for large vessels, and Livingston, at the mouth of the river, has become the port through which Izabal exports ebony, rosewood, and other fine cabinet woods, sarsaparilla, cacao, and coffee. Pop., about 4000.

IZABAL, Lake. An inlet of the Gulf of Honduras in the eastern part of Guatemala, Central America (Map: Central America, C 3). It extends in a southwestern direction for 36 miles and has a width of about 11 miles. Its depth is sufficient for large steamers, but the bar at the mouth makes it difficult of navigation.

IZAK, Heinrich. See Isaak, Heinrich.

IZALCO, ē-säl'kô. A remarkable volcano, near the Pacific coast, 36 miles northwest of the city of San Salvador, Guatemala. It suddenly burst out of the plain in 1770 and since then has been active at regular intervals. Great quantities of material have been ejected, and the cone has gradually risen to the height of about 6000 feet. It is one of the series known as the San Salvador group of volcanoes that forms a prominent feature of the Guatemalan coast.

IZAMAL, ē'sȧ-mäl'. A town in the State of Yucatan, Mexico, situated 41 miles by rail east of Mérida (Map: Mexico, P 7). It is noted chiefly for its ancient ruins, which have interested many eminent archæologists, among others Charnay and Bourbourg. Pop., about 6000.

IZ'ARD, George (1776–1828). An American soldier, son of Ralph Izard. He was born at Richmond, Surrey. He graduated at the College of Pennsylvania in 1792; then went to England, where he entered the military school at Kensington, and after a short stay there studied at Edinburgh, Marburg, and Metz. He was lieutenant of engineers in the United States Army (1794–96); returned finally to America (1797); was sent to Charleston as the engineer of Castle Pinckney, and later commanded Fort Mifflin and West Point. He was then for a short time Secretary of the American Legation at Lisbon. He resigned from the army in 1803, but at the beginning of the War of 1812 reentered it as colonel of the Second Artillery and rose to the rank of major general (1814). He was ordered to the northern frontier, where he served at first under Gen. Wade Hampton and later (in August, 1814) relieved General Brown in the command on the Niagara frontier. In October he crossed the Niagara with about 8000 men and moved against General Drummond, on the Chippewa. After a sharp skirmish (October 19) near Cook's Mills, on Lyon's Creek, General Drummond withdrew his troops to Fort George and Burlington Heights. Izard failed to follow and retired to Black Rock; and this conduct, though approved by the government, aroused popular criticism. This led to his publishing in 1816 a volume entitled *Official Correspondence with the War Department, 1814–15.* President Monroe appointed him Governor of Arkansas Territory in 1825, a post which he held until his death.

IZARD, Ralph (1742–1804). An American patriot of the Revolutionary period, born near Charleston, S. C. He inherited a large estate, was educated at Cambridge, England, and on his return to America passed his time chiefly in New York as a young man of fashion. Returning to England in 1771, he lived in London until 1774, when he went to the Continent because of the impending war between England and her American Colonies. From 1776 to 1779 he was nominally Commissioner of the United States to Tuscany, but remained during the greater part of this period at Paris and took an active part in the controversy between Franklin and Arthur Lee, siding with the latter and vigorously attacking the former. In 1780 he returned to America and soon afterward pledged his valuable estate to enable Congress to procure ships of war from Europe. He was instrumental in securing the appointment of General Greene to the command of the southern army. He was a delegate to the Continental Congress (1782–83), and was a member of the United States Senate from 1789 to 1795. His correspondence was published by his daughter in 1844.

IZCOHUATL, ēs'kô-wä't'l. See Itzcoatl.

IZ'DUBAR'. See Gilgamesh.

IZIOCATL. See Itzcoatl.

IZMAILOV, ēz'mȧ-ē'lôf, Alexander Efimovitch (1779–1831). A Russian poet and writer of fables, born in Moscow. He was educated at the School of Mines and shortly after was appointed Governor at Archangel, then at Tver. He is chiefly known by the 120-odd fables in which he portrays Russian characteristics. A collection of them was published in 1814. He also contributed to periodical literature and wrote romances such as *Biednaia Matcha* (1801). The seventh edition of his poems appeared in 1849, and his complete works were issued in 1849.

IZMID, ĭz-mēd'. See Nicomedia.

IZRAIL, ĭz'rä-ĭl. See Azrael.

IZTACCIHUATL, ēs-täk-sē'hwä't'l, or **IXTACCIHUATL**. A lofty mountain in Mexico, just north of Popocatepetl, 40 miles southeast of the city of Mexico. It is of volcanic origin, but has no crater. It is oblong in shape, and its summit is covered with perpetual snow; its profile resembles a woman lying wrapped in a white shroud, whence its name, which means White Woman. Its height is about 17,000 feet. On a clear day, from the valley of Mexico, it is a most impressive and inspiring sight.

IZÚCAR, ē-sōō'kär. A city and district of Puebla, Mexico, situated 35 miles southwest of the city of Puebla, at the base of Popocatepetl (Map: Mexico, K 8). It is in the midst of a rich sugar region and has railway communication with Puebla. Pop., about 12,000.

J

J The tenth letter of the English alphabet, and the latest letter added to our script. In form *J* was at first merely a variation of *I*, and both characters were used interchangeably for either vowel or consonant. A differentiation later followed in the value of the symbols. *J* was appropriated to represent the consonant sound, *I* was confined to the vowel. In English this usage did not become established until the seventeenth century. In the minuscule letter the dot over the *j* is a proof of its original identity with *i*. The Latin *I* came from the Greek *ἰῶτα*, *iota*, which itself was derived from the North Semitic *Yod*. This latter originally represented the consonantal sound *y*, but later was used also to indicate the vowel *i*.

Phonetic Character. In English *j* has the composite sound of *d* + *zh*, as in *judge*. It is thus a combination of the voiced dental explosive and the voiced palatal spirant. In French, however, the spirant value (*zh*) alone is given the letter, as in *jour* (*j* pronounced as the *z* in English *azure*); in German *j* has the original *y*-sound of the Latin *i*-consonant; in Spanish the *j* has a sound resembling a guttural *ch*. As to its source, the English *j* appears chiefly in words derived from the Romance languages, and hence from the Latin *j* (*i*) or *di*. Thus, the English word "to judge" has its *j* from the OF. *jugier*, Lat. *judicare;* on the other hand, Eng. "journal" is through the Fr. *journal* from the Lat. *diurnalis*. Before the differentiation of *J* and *I* in English the combination *Gi* for *J* was sometimes used in Middle English, as in *Giwes* for *Jews*, no doubt under Romance influence; cf. Ital. *Giovanni*, from Lat. *Johannes*.

JA'BAL. A son of Lamech and brother of Jubal and Tubal Cain, according to Gen. iv. 20. He is said to be the father, or ancestor, of those who dwell in tents and with cattle. The name is supposed to designate him as shepherd or herdman and has been connected with the Hebrew and Phœnician word *jobel*, 'ram.' It is also supposed by some scholars to be another form of Abel (q.v.), to which the same meaning is naturally assigned; but the evidence for this is not conclusive. Jabal's brother Jubal is said to have been the father, or ancestor, of such as handle the harp and pipe.

JABALPUR, jŭb'ŭl-po͞or', or **JUBBULPORE.** A division of the Central Provinces (q.v.), British India (Map: India, D 4). It comprises the districts of Jabalpur, Saugor, Damoh, Seoni, and Mandla and has an area of 18,953 square miles. Pop., 1901, 2,081,480; 1911, 2,421,064. Capital, Jabalpur.

JABALPUR, or **JUBBULPORE.** The capital of a district and division of the same name in the Central Provinces and one of the most important railroad junctions of British India, near the Nerbudda River, 200 miles southwest of Allahabad (Map: India, D 4). It is 1306 feet above the sea, picturesquely situated in a hilly, rock-encircled basin marked with numerous gorges. Education is carried on in a government college, the law school, an engineering school, normal schools for both sexes, and an industrial school. The town has wide and straight streets, and a garrison is stationed here. It manufactures cotton goods, carpets, wire netting, brass work, and statuary, and its export and import trade is of considerable importance. It was formerly the great centre of the Thugs (or stranglers), who were eventually suppressed by the British government. The Marble Rocks, 11 miles distant, is a favorite excursion place and a scene of great natural beauty and interest. Pop., 1901, 90,533; 1911, 100,651.

JAB'BOK (Heb. *yabbōk*, copious river, probably from *bāḳaḳ*, to pour forth). A stream of the East Jordan country, which rises near Rabbath Ammon and after a course of about 65 miles, not taking into account its numerous windings, empties into the Jordan 23 miles north of the Dead Sea (Map: Palestine, D 3). The modern name is Nahr ez-Zerqa (blue river). It affords some of the most picturesque scenery of Palestine. Before the conquest of Canaan it separated the territories of Ammonites and Amorites (Josh. xii. 2) and later flowed through the Land of Gad. On its banks Jacob is represented as having had his encounter with the mysterious antagonist (Gen. xxxii. 24–25).

JAB'IRU (Brazilian name). 1. A large stork (*Mycteria americana*, or, as modern taxonomy has it, *Jabiru mycteria*), common in tropical America and occasionally found as far north as Texas. It is about 4 feet long and 7 feet across the wings. The plumage is pure white, but the head and neck are destitute of feathers and are black, with a reddish or flesh-colored ring around the base of the neck. The bill is a foot long, very thick at the base and slightly bent upward at the tip. The jabiru is the only true stork (sub-family Ciconiinæ) found in North America. 2. Two other storks, one Oriental and the other African, which are so closely allied that, were they not widely separated, they would probably be considered as members of a single genus. The former is the black-bellied jabiru of Australia (*Xenorhynchus asiaticus* or *australis*), represented in southeastern Asia by a similar species or variety; and the latter is the handsome "saddle-billed" stork (*Ephippiorhynchus senegalensis*) of the Sudan, one of the most common and conspicuous wading birds of the marshy region of the upper Nile.

JABLOCHKOV, yä′blŏch-kŏf, Paul (1847–94). A Russian electrical engineer and inventor, born at Serdobsk in the Government of Saratov. In 1871–75 he was director of the telegraph lines between Moscow and Kursk, and in 1876 he moved to Paris, where he devoted himself to experiments with electric arc lamps. He succeeded in inventing the "candles" known by his name, that were in general use for a few years. He returned to Russia in 1894 and there died in poverty.

JABLOCHKOV CANDLE. See Electric Lighting.

JABLONOWSKI, yä′blȯ-nŏv′skē, Joseph Alexander Pruss, Prince (1712–77). A Polish-German patron of letters. He was Waywode (administrative chief) of Nowogrodek, and left his fatherland in 1768. He went to Leipzig, where he endowed the Jablonowski Scientific Association and offered three prizes for monographs on Polish history, economics, and mathematics or physics. This association began its work in 1774 and after an interval of inactivity was revived in 1828. It published *Acta Societatis Jablonovianæ* (1772–73), *Nova Acta* (1802–45), and the series of prize monographs (1847 et seq.).—Stanislas (1634–1702), of the same family, was one of the conspirators against King Michael, and a leader of the Poles in the war with Turkey. He was made a German prince by the Emperor Leopold for his services at Vienna. Jonsac's *Histoire de Stanislas Jablonovski* was translated into Polish by a second Prince Stanislas (1799–1878), a Polish artillery officer.

JABLONSKI, yȧ-blȯn′skē, Daniel Ernst (1660–1741). A Polish Protestant theologian, born at Nassenhuben, Prussia. He studied at the University of Frankfort and in England and the Netherlands. In 1683 he took charge of the Reformed Church in Magdeburg, where he distinguished himself as a preacher. From 1886 to 1891 he was rector at the Moravian College, Lissa. Frederick I chose him for his chaplain (1691–93), and by 1699 he was the leading bishop of the Moravian church. That year he published his *Hebrew Bible*, and he also brought out an edition of the *Talmud* (1715–21), besides translating into Latin Bentley's sermons on "A Confutation of Atheism," which formed the first course of the Boyle lectures. His knowledge of Oriental languages was one of his qualifications for the presidency of the Berlin Royal Academy of Sciences (1733), and he labored long, though unsuccessfully, to bring about a union between the Swiss, German, and English Protestants.

JABON, hȧ-bōn′, or **JABONCILLO,** hä′bȯn-thē′lyȯ. See Soapfish.

JAB′ORAN′DI. A name given in South America to several species of plants used as diaphoretics. The plants grow chiefly in Brazil and are most known in the neighborhood of Pernambuco. Those recognized by the Pharmacopœia of the United States are *Pilocarpus selloanus* and *Pilocarpus jaborandi.* (See Alkaloids.) When bruised, the leaves are aromatic and taste somewhat bitter. The important constituents are a volatile oil and two alkaloids called pilocarpine and jaborine. The latter alkaloid somewhat resembles atropine in its action. An infusion of the leaves or a fluid extract or tincture may be given internally; or one of the salts may be administered with a hypodermic syringe. When an infusion of 90 grains of the dried leaves is swallowed, it produces in the course of two or three minutes a flushing of the face, and in the course of five or six minutes drops of sweat appear on the forehead and soon afterward on other parts of the body and limbs. When sweating is established, the face becomes pale, and a profuse secretion of saliva and nasal and bronchial mucus is poured out upon the mucous surface, and often there is an abundant secretion of tears. The salivation is often so profuse as to interfere with speech. The average duration of sweating is about one hour and a half, and the temperature usually falls 1° F. The average loss of fluid by sweating is nearly two pints, but the loss is said sometimes to be four quarts if the salivary and mucous secretions are included. Sometimes, though rarely, sweating does not take place, but salivation is more frequently absent than sweating. When one of these is diminished, the other is increased. Vomiting is a usual occurrence, but the nausea is not great. The quantity of urine secreted during the sweating is diminished and is passed with pain. Urea appears in the perspiration and saliva. The pulse is quickened at first and later slowed, and the arterial tension is increased. Larger doses later cause marked cardiac depression. The sight frequently becomes dimmed—an effect attributed to the action of the drug on the muscles of accommodation belonging to the lens. (See Eye.) Jaborandi is an effective galactagogue, or promoter of the lacteal secretion. The hypodermic injection of one-sixth or one-fifth of a grain of pilocarpine or the hydrochlorate produces much the same effects as the internal administration of the infusion of the leaves, but the action is more prompt as well as more lasting. With the hypodermic injection sweating always takes place, and vomiting is less frequent. Applied locally to the eye, it causes marked contraction of the pupil and diminution of intraocular tension. In general it may be said that the action of pilocarpine is antagonistic to that of atropine.

The medical uses of jaborandi are few, and it should be used internally only with caution, on account of its depressing action upon the heart. It has been employed to cause absorption of effusions into the serous cavities, either those of inflammatory origin, such as pleurisy, or those due to circulatory failure or insufficient action of the kidneys, such as hydrothorax and dropsy. It may be said that other remedies may be found which are quite as efficacious and lack the depressing effect. In uræmia and eclampsia it has been used, but *Veratrum viride* is now preferred. In conjunction with morphine it is employed as an antidote in atropine poisoning. Its chief use, however, is in glaucoma (q.v.), in which its local application to the eye causes diminution of the intraocular tension. It is generally given as pilocarpine hydrochloride for this purpose. It is sometimes employed to break up adhesions of the iris by contracting the pupil. For this purpose it is alternated with atropine, which causes dilatation. It is used internally and locally to cause a thicker and coarser growth of hair.

JABOTICABA, zhȧ-bō′tē-kä′bȧ. An edible fruit produced by the Brazilian tree *Myrciaria cauliflora* and other species. The trees attain a height of 35 to 40 feet and produce on their trunks and larger branches large numbers of maroon-purple fruits ½ to 1½ inches in diameter. The fruits resemble grapes somewhat, but have a thicker, tougher skin. The trees flower several times during the year, depending on rains or water supply, and the fruit ripens within three or four months. An attempt has been made to grow the trees in Florida, but the introduction was so recent that its adaptation cannot be affirmed.

JACA, jä'kȧ. A tropical tree, closely related to the breadfruit. See JACK TREE.

JAC'AMAR (Fr., Sp. *jacamar*, from Brazilian *jacamarica*). One of the birds of the tropical American family Galbulidæ, of which about 26 species are known, all inhabitants of the region east of the Andes. They are comparatively small, are brilliant in plumage, resemble the bee eaters of the Old World, and in their habits are like the arboreal insectivorous kingfishers. The Brazilians call them "foolish" on account of their stupidity. Jacamars nest in holes in banks or stumps and lay only two white eggs.

JACANA, jăk'ȧ-nȧ, *Portug. pron.* zhä'sȧ-nä' (Brazilian *jaçanã*). One of the small, raillike plovers of the family Parridæ, remarkable for their carpal spurs and for the extraordinary length of their toes and claws, adapted to the bird's habit of seeking its food (green sprouts of rice and the like, insects, and small aquatic animals) by walking on the floating leaves of the water plants in weedy lakes and slow rivers. They belong to the tropics of various parts of the world. The common species of South America (*Jacana spinosa*), abundant in Guiana and Brazil, is about 10 inches long; black, except the back and part of the wings, which are of a bright chestnut color. Another species is found in tropical America and extends its range as far north as Texas. The prevailing color of the plumage is rich purplish chestnut. Their general habits are much like those of the gallinules, which they resemble in bodily appearance. The strong spur with which the bend of each wing is armed is a formidable weapon in the fighting that seems incessant among them.

Of the 10 or 12 Old World species, one or two need special mention. The pheasant-tailed jacana, or water pheasant (*Hydrophasianus chirurgus*), is a familiar bird throughout the Oriental region and, like another species (of northern Australia), is often called lotus bird, because of its fondness for places where that plant prevails. Its colors are pleasing, and its tail is prolonged by four very long feathers, which suggest those of a pheasant. During the rains, in their favorite haunts, each pair forms a rude flat nest of weeds and grass, interwoven beneath with the long shoots of aquatic plants, which support it buoyantly on the surface. All the family lay rich olive-brown eggs, closely marked with dark lines. This bird is a favorite subject for representation in the native art of all the countries from India to Japan. The genus *Metopedius*, hardly different from the American jacana, has representatives in Africa, Madagascar, and India; and the genus *Hydrolector* belongs to northern Australia and the neighboring islands. Consult authorities for South America, India, and the East, mentioned under BIRD. See Plate of RAILS, ETC.

JAC'ARAN'DA WOOD (Brazilian name). A hard, heavy, brown South American wood, which from its faint odor is also called rosewood. It is derived from several species of *Jacaranda*, of the family Bignoniaceæ. Several species, locally called caroba, etc., are employed medicinally in many South American countries.

JACARÉ, jăk'ȧ-rā', *Portug. pron.* zhä'kȧ-rā' (Portug. *jacaré, jacareo,* from the Brazilian name). Any of the caymans or alligators (qq.v.) of tropical America, the species of which are distinguished by some qualifying word. Thus, the jacaré tinga is the small six-foot *Caiman trigonatus*, with the slender muzzle and black-banded tail; jacaré nassu is the great *Caiman niger*, sometimes 20 feet long. Used alone, the name usually means the common, or spectacled, cayman (*Caiman sclerops*), which is very numerous from southern Mexico to northern Argentina. It is of medium size and is distinguished especially by the fact that the upper eyelid is rugose, partly ossified, and often produced into a small horn. All these alligators spread into the flooded forests in the wet season and congregate in the river courses during the dry season. They do vast damage to stock and kill many human beings; but their hides are of commercial value, and their flesh is eaten by all the Amazonian Indians.

JACCOUD, zhȧ'kōō', FRANÇOIS SIGISMOND (1830–1913). A French physician, born at Geneva. He went to Paris about 1850 as a music teacher; studied medicine, winning a gold medal in 1859 and his degree in the same year; and in 1863 became assistant in the medical faculty. He was appointed titular professor of pathology in the faculty of medicine in 1876, became permanent secretary of the Académie de Médecine in 1877, and in 1883 began to teach in the medical clinic at the Pitié. He wrote: *De l'organisation des facultés de médecine en Allemagne* (1864), a report on his official investigation; *Leçons de clinique médicale* (1867–88); *Traité de pathologie interne* (7th ed., 1883); *Du froid comme cause de pneumonie* (1887); and a translation from Graves, *Clinique médicale* (1861–62); and he edited the *Nouveau dictionnaire de médecine et de chirurgie* (1864–86).

JACHIN (jā'kĭn) **AND BOAZ.** The names of the two brazen pillars which Solomon set up in the porch of the temple (1 Kings vii. 15–21).

JACHMANN, yäG'mån, EDUARD KARL EMANUEL (1822–87). A Prussian naval officer, born at Danzig. He entered the service in 1845 and became a captain 14 years later. In 1862 he took part in the expedition to East Asia and China, and in 1864 defeated the Danes near Jasmund, on the island of Rügen, whereupon he was promoted to be rear admiral. Placed at the head of the Navy Department in 1867, he was made vice admiral in the following year, and in the Franco-German War was commander of the Prussian fleet in the North Sea. He was Minister of the Navy in Von Stosch's cabinet (1872), but retired a year later.

JACINI, yä-chē'nē, STEFANO, COUNT (1827–91). An Italian economist and statesman. He was educated in Switzerland, in German universities, and at Milan. During the Austrian rule of Lombardy in 1849–59 he engaged in economic investigation, writing *La proprietà fondiaria in Lombardia* (1856) and *Sulle condizioni economiche della Valtellina* (1858). For his writings on the evils of Austrian rule, he was made Minister of Public Works under Cavour in 1860–

61 and later held the same office in 1864–67. He helped to bring about the alliance with Prussia for the war against Austria in 1866, participated in the organization of Italian railroads, and was president of the Agricultural Commission of 1881–86. He was made Senator in 1870 and Count in 1880.

JACITARA (jăs'ĭ-tä'rȧ) **PALM** (South American Indian), *Desmoncus macroacanthos*. A palm found in the lowland forests of the Amazon. It has a slender, flexible stem which often climbs, by means of hooks, to a height of 60 or 70 feet. The outer part of the stem, cut into long strips, is much used to make the plaited cylinders in which grated cassava root is squeezed in the process of extracting the starch. These wicker cylinders, which are very durable, will outlast two or three made from other fibers. The material seems suitable for many other purposes.

JACK. A piece of mechanical apparatus for raising heavy weights short distances. Jacks are made in a variety of forms, but may be divided into lever jacks, screw jacks, hydraulic jacks, and geared jacks. The lever jack is the device used from a remote antiquity for lifting wagon axles so as to free the wheel from the ground. A long lever swings upon a pin in a post as a fulcrum, and the short arm goes under the axle. There is a device like a ratchet or a linked chain to hold the axle from falling when the lever is no longer depressed. In the screw jack a nut is similarly supported on a hollow post, and a lever turns the screw in the nut and, the latter being held from turning, the screw is advanced with great power, owing to the slow motion axially through the nut. Hydraulic jacks are portable forms of hydraulic presses. In geared jacks a combination of levers and gearing takes the place of the simple lever or screw of the other jacks and the water of the hydraulic jacks. The essential requirement of a jack is that it shall be of compact and sturdy construction and shall be conveniently portable. The ordinary screw jack is an excellent illustration of all these qualities. Jacks are much used in railroad wrecks or accidents and in house moving and shoring and in erecting machinery. See Hydraulic Press.

JACK. In the United States navy, a blue flag with white stars, corresponding in all respects to the similar portion of the national flag, which is sometimes called the *union*. In Great Britain and Germany the *jack* is a flag which is similar to the upper quarter of the man-of-war flag which is nearest the staff. In countries which have no union in their man-of-war flag, the jack more nearly resembles the colors carried at the stern except in size. It is set on a staff at the stem, or on the bowsprit cap of rigged ships. It has no particular significance at the present time, but is usually hoisted in port. The United States naval jack is carried in the bow of a boat when an ambassador, minister, or chargé d'affaires of the United States is being carried by it. See Flag, and Colored Plates with the articles National Flags and United States.

JACK, or JACKFISH. A name applied, often in connection with some qualifying word, to many fishes, usually marked by liveliness of action. 1. A pickerel, especially the Eastern green pickerel. 2. One of the Californian rock fish (*Sebastodes paucispinis*). 3. Either of two West Indian amber fishes (*Seriola lalandi* or *Seriola dumerili*), more often called amber jacks. 4. Any of various scads and crevalles, especially the jurel (q.v.).

JACK, Captain. A picturesque character in American frontier life about the middle of the eighteenth century, called also the Black Hunter or Black Rifle. After the massacre of his family and burning of his home on the Juniata by Indians, he devoted himself unceasingly to vengeance and gathered about him a band of daring men who in Indian dress engaged in a relentless pursuit of all Indians and in the defense of white settlers.—The name is applied also to Ki-ent-poos, the principal leader of the Modoc Indians (q.v.) in northern California in the War of 1872–73. He acquired notoriety by the deliberate murder of General Canby while attending a peace conference, for which he and others concerned in the attack on the commissioners were hanged, on the final suppression of the outbreak.

JACK-A-GREEN. See Jack-in-the-Green.

JACKAL, jăk'ạl (OF. *jackal, jakal*, Fr., Sp. *chacal*, from Ar. *jaqāl*, from Pers. *shaghāl*, from Skt. *sṛgāla*, jackal). The common name of a number of species of the genus *Canis*, abounding in Asia, Africa, and southeastern Europe. They agree in all their most important characters with wolves and dogs (see Canidæ), although the form and tail are somewhat foxlike. The head is narrow and the muzzle pointed. The ears are erect and rather large. The tail is not so long as in foxes, but is almost equally bushy. All the jackals are of small size, as compared with wolves, seldom exceeding 15 inches in height at the shoulder. Their colors are buff and tawny, more or less grizzled; the tip of the tail is always dark. They make holes for themselves in the ground, or take possession of such as already exist among rocks or ruins; and in these they spend the day, not venturing abroad, as a rule, till the dusk of evening. They hunt during the night in troops, and their howlings are described by all who have heard them as peculiarly unpleasant. The notion that the jackal is the "lion's provider" is one of the exploded fables of natural history, although it may have some foundation in the lion occasionally following a troop of jackals in full cry and appropriating "the lion's share." Jackals are not only ready to devour any animal which they can run down, but any carrion that they may find. They follow armies; they dig up the ill-buried dead; they rob henroosts and outhouses; but they are as omnivorous as domestic dogs, and eat farinaceous or other vegetable food when it comes in their way; they are even said, like foxes, to enter vineyards and devour the grapes. They have a very offensive smell, which, however, is said to diminish through domestication, and they are domesticated without difficulty. Everywhere jackals interbreed with native dogs, and doubtless they contributed essentially to the early stock. The foregoing applies especially to the "common" jackal (*Canis aureus*), which is spread, with many variations, throughout the semidesert region from the Sudan to Afghanistan, India, and Burma, and also is common in Europe as far north as Heves Comitat, Hungary, and on the plains of Greece and European Turkey. In northern India it is known as pheal, and in southern India as bhalu, and many weird stories are told of it and its relations to the tiger. The African variety is rather larger and grayer than the Asiatic.

The black-backed jackal or tenlie (*Canis mesomelas*) is a very distinct species, of bright coloration. The sides and limbs are red to reddish yellow; the back and end of the tail are black. It is widely distributed throughout eastern and southern Africa, and its handsome fur is highly prized. A third African species, the side-striped jackal (*Canis adustus*), called rubuyo on the West Coast, and canduc eastwardly, is widely scattered south of the equator and differs from the others in having rather shorter and much darker ears and the sides marked with one or more curving light bands bordered with black—a feature, however, which is highly variable. Cf. DOG; FOX; WOLF; and see Plate of FOXES AND JACKALS.

JACK-A-LANTERN. See IGNIS FATUUS.

JACK-AMEND-ALL. A nickname given to Jack Cade (q.v.).

JACK AND JILL. A nursery song. The name Jill is a corruption of the Norman Julienne, once common in England in the form Gillian. The prototypes of Jack and Jill in Norse mythology are two children rescued by the moon from their father, who forced them to draw water all day. The Scandinavian peasantry still see in the spots on the face of the moon the children with their pail.

JACK AND THE BEAN STALK. A nursery legend found in the folklore of many peoples. The harp has been interpreted as the wind, the bags of treasures as the rain, the red hen as the sun.

JACKASS. A domestic donkey; often abbreviated into jack, especially to designate an entire male. See *Donkey* under ASS.

JACKASS KINGFISHER. See LAUGHING JACKASS.

JACKASS PENGUIN. Any penguin of the genus *Spheniscus*, so called from their cry, which is similar to the braying of a donkey. See PENGUIN.

JACK BRAG. A pretentious character in Theodore Hook's novel of the same name (1837).

JACK'DAW. A familiar Old World crow (*Corvus*, or *Colœus, monedula*), very widely distributed in Europe, Asia, and North Africa. It is 13 or 14 inches long and deep black in color, appearing dark gray on the neck, but with a steel-blue gloss elsewhere. It frequents towns and villages and makes its home in towers, steeples, old chimneys, and similar places. It is more or less gregarious and social, is easily domesticated, and exhibits great shrewdness in all its actions. Like other crows, it has considerable power of mimicry and makes an interesting and often an amusing pet. It builds a large nest of sticks and twigs, lined with wool and other soft substances, and lays four to seven eggs, similar to those of American crows.

JACKDAW OF RHEIMS, rēmz, THE. One of the best known of the *Ingoldsby Legends*, the story of a jackdaw which stole the ring of a cardinal and, through the curse laid by the cardinal on the thief, was afflicted until he restored the ring. It has been made into a "comic cantata" with very effective music by George Fox.

JACK'ET (OF. *jaquette, jaquet*, dim. of *jaque*, Sp. *jaco*, It. *giaco*, Eng. *jack*, cheap coat of mail). A long cylinder of steel surrounding the tube of a gun for about half its length from the breech end and projecting slightly beyond the latter. See ORDNANCE; GUNS, NAVAL.

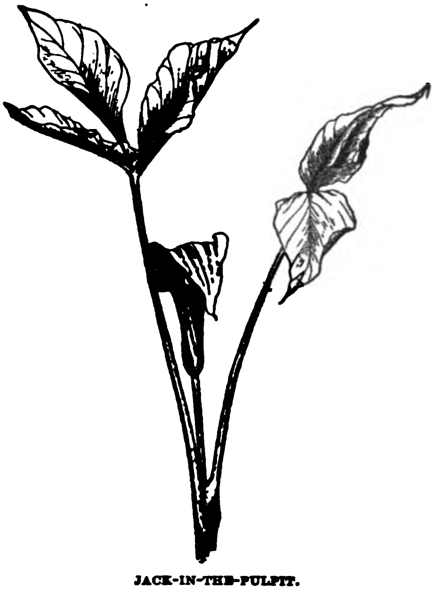
JACKFISH. See JACK.

JACK FROST. The personification of frost or cold in nursery tales.

JACK HORNER. An old and familiar English nursery rhyme. Various explanations of its origin have been given. It is said that the abbot of Glastonbury sent to Henry VIII or to the commissioners, when the estates of the monasteries were seized, the title deeds to certain manors, and for safety inclosed them in a pasty, which was intrusted to a messenger. The latter opened the crust and extracted the deeds of the manor of Wells, and the abbot was punished for having withheld them. The rhyme is said by Halliwell to be derived from "Jack and his Stepdame," an older production.

JACKING. A form of night hunting and fishing formerly much resorted to, but now generally discountenanced by American sportsmen and forbidden by statute in most of the United States. Jacking deer was done from a rowboat or canoe, preferably the latter, because a paddle can be used noiselessly. Any light which could be kept concealed until it was needed would serve. Sometimes this light was arranged in the bow of the craft, sometimes it was a lamp fitted into a specially made helmet-like hat. Such a light flashed suddenly at a deer heard feeding or drinking at the water's edge will almost always cause the animal to stand still for a few moments, either in terror or out of curiosity, and its eyes will show plainly in the rays of the jack. Under such conditions it is practically impossible to be certain of killing the animal outright, even with a shotgun. Similar devices are used at night to lure fish to the surface, where they are speared.

JACK-IN-THE-GREEN. The name of one of the principal characters in the May Day festivities in England. The part is usually taken by a boy, whose costume is profusely adorned with wreaths of flowers or greens. Sometimes called *Jack-a-green*. Consult Joseph Strutt, *Sports and Pastimes of the English People*, edited by Hone (London, 1830) and often revised since then. See MAY.



JACK-IN-THE-PULPIT.

JACK-IN-THE-PULPIT, INDIAN TURNIP (*Arisæma triphyllum*). An American perennial herb of the family Araceæ, common in moist, shady woods. It has a rather large, flattish corm or tuber noted for its acridity, due to the mechanical effects of needle-like crystals called raphides, and often used in domestic medicine; usually two leaves of three leaflets each; and a club-shaped spadix covered by a green or purple spathe which falls away in early summer and exposes the conspicuous red berries at maturity. When properly cooked, the corm resembles in flavor a well-boiled Irish potato. When planted in cool, moist, rich soil, the plant succeeds well in gardens.

JACK KETCH. A former familiar title for the hangman in England, dating from the time of John Ketch (died 1686), public executioner during the reign of James II. At the time of its origin the title was also often closely associated with the notorious Judge Jeffreys. The name is said to be a corruption of Jacquett's, from the name of the lord of the manor of Tyburn. In France the headsman is euphemistically styled M. de Paris.

JACK-O'-LANTERN. See Ignis Fatuus.

JACK PUDDING. The English equivalent of the German Hanswurst.

JACK RABBIT. See Hare.

JACK ROBINSON. A name occurring in the phrase "Before you can say Jack Robinson," with the meaning of "instantly." The origin of the phrase is unknown. It has been referred to a humorous song by Hudson, a London tobacconist; to a Jack Robinson distinguished by the briefness of his visits to his neighbors and his hasty departures; and by Halliwell to an old play, in which it is cited under the form "as easie . . . as tys to saye *Jacke! robys on.*"

JACKS, Lawrence Pearsall (1860-). An English theologian. He was born in Nottingham, was educated at the University School there and at the University of London, Manchester College, Göttingen, and Harvard. He entered the Unitarian ministry in 1887, was an assistant at Bedford Chapel to Stopford A. Brooke (whose daughter he married in 1889), preached at Renshaw Street Chapel, Liverpool, and at the church of the Messiah, Birmingham, and in 1903 became professor of philosophy in Manchester College, Oxford. From its foundation in 1902 he was editor of the *Hibbert Journal*, an important Unitarian review. Among his brilliant sketches and essays are: *Mad Shepherds, and Other Human Studies* (1910); *The Alchemy of Thought* (1910); *Among the Idolmakers* (1911); *All Men are Ghosts* (1913).

JACK SALMON. The wall-eyed pike. See Pike Perch.

JACK SNIPE. 1. A sportsman's name in America for the pectoral sandpiper (*Tringa*, or *Pisobia, maculata*) of the books, also called meadow snipe and grass snipe. It is 8½ to 9 inches long; the wing 5 to 5½ inches. Its color is yellowish brown, striped with blackish above; the scapulars have chestnut edgings; belly and chin white; throat and breast ashy, shaded and sharply streaked; rump blackish; bill and feet greenish. It is migratory in the United States, winters to the southward, and as a rule breeds only in sub-Arctic Canada and Alaska, where it is very numerous in summer west of the Mackenzie, growing rare towards the east. It is very abundant, however, in Labrador in summer. Its course of migration seems to be mainly eastward of the cordillera and plains, for it is never numerous west of Manitoba. It is different from most sandpipers in its snipe-like behavior; i.e., it does not go much in flocks, but appears upon the marshes singly or in pairs.

2. The jack snipe or half snipe (*Gallinago*, or *Limnocryptes, gallinula*) of Great Britain is a true snipe (q.v.), about half the size of the common typical species of Europe. It is rather infrequent in England and is noted for lying so close as almost to be trodden upon before rising. See Pectoral Sandpiper, and Colored Plate of Shore Birds.

JACKSON. A city and the county seat of Jackson Co., Mich., 76 miles by rail west of Detroit, on the Grand River and on the Michigan Central, the Lake Shore and Michigan Southern, the Grand Trunk, the Michigan United Traction, and the Cincinnati Northern railroads (Map: Michigan, E 6). It is built on both sides of the river; the principal streets are paved with brick; and among more prominent features are the State prison, an Odd Fellows Home, a Carnegie library, fine parks, and a fine government building. Jackson is the centre of a productive farming region, and coal and fire clay exist in the vicinity. It has a considerable trade in agricultural produce, and is also an important wholesale distributing point, especially for reaping and mowing machines. Its extensive manufactures include foundry and machine-shop products, agricultural implements, automobiles, stoves, refrigerators, brass, steel, and iron castings, automobile accessories, drop forgings, milling machinery, flour, sewer pipe, fire brick, paper, corsets, etc. The Michigan Central Railroad has large car and machine shops here. The city owns and operates its water works. In 1914 it adopted the commission-manager plan of municipal government. Jackson was settled in 1829, but it did not develop rapidly until after railroad communication was opened by the Michigan Central in 1841. It was chartered as a city in 1857. Pop., 1900, 25,180; 1910, 31,433; 1914 (U. S. est.), 34,097.

JACKSON. The capital of the State of Mississippi, on the Pearl River, 181 miles north of New Orleans, La., on the Illinois Central, the New Orleans Great Northern, the Alabama and Vicksburg, the Yazoo and Mississippi Valley, and the Gulf and Ship Island railroads (Map: Mississippi, E 6). Besides the State capitol, some prominent structures are the Governor's mansion, government building, Millsaps College (Methodist Episcopal), founded in 1892, Bellhaven College for young ladies, Jackson College, Campbell College, State institutions for the deaf and dumb, the blind and the insane, hospitals and sanitariums, James Observatory, a Carnegie library, and the State library. Among the points of interest are the remains of fortifications erected at the siege of Jackson in 1863, the old capitol, a Confederate monument, and a statue of Jefferson Davis. The city is in a cotton-growing region, with very fertile soil, but not far from the sandy, long-leaf-pine region, and has considerable trade and valuable manufactures, including cottonseed products, lumber and lumber products—staves, hubs, spokes, etc.—brooms, machinery, plows, and harrows. Jackson adopted the commission form of government in 1913. The city owns its water works. Settled about 1830, Jackson was incorporated 10 years later. During the Civil War it was occupied in 1863 by General Grant, and in 1864 was for the most part destroyed by General Sherman.

Pop., 1900, 7816; 1910, 21,262; 1914 (U. S. est.), 26,990.

JACKSON. A city and the county seat of Jackson Co., Ohio, 95 miles south by east of Columbus, on the Hocking Valley, the Baltimore and Ohio Southwestern, and the Detroit, Toledo, and Ironton railroads (Map: Ohio, E 7). There are coal and iron mines, iron furnaces, foundries, a shoe factory, pipe works, auger-bit factory, railroad shops, plow works, etc. Jackson, settled as early as 1795 and incorporated in 1847, is governed by a mayor, elected every two years, and a council. Pop., 1900, 4672; 1910, 5468.

JACKSON. A city and the county seat of Madison Co., Tenn., 85 miles by rail northeast of Memphis, on the south fork of the Forked Deer River and on the Nashville, Chattanooga, and St. Louis, the Illinois Central, the Birmingham and Northwestern, and the Mobile and Ohio railroads (Map: Tennessee, B 3). Union University, Lane College (colored), and the Memphis Conference Female Institute are situated here, and there are Carnegie and collegiate libraries, an Elks Home, two hospitals, and several court buildings. Highland and Lancaster parks are places of scenic interest and summer amusement resorts. The city is an important truck-shipping centre, carries on an extensive cotton trade, and among its industrial establishments are large cotton and cottonseed-oil mills, railroad shops, boiler and engine works, furniture, heading, spoke, skewer, and plow factories, grain mills, and manufactories of porch columns, overalls, veneers, tile and brick, automobiles, etc. Settled in 1819, Jackson was incorporated in 1854 and adopted the commission form of government in 1915. The city owns and operates its water works and electric-light plant. Pop., 1900, 14,511; 1910, 15,779.

JACKSON, Abraham Reeves (1827–92). An American physician, born in Philadelphia. He graduated at the Pennsylvania Medical College in 1848; practiced in Stroudsburg, Pa., and Chicago, Ill.; founded and became surgeon-general of the Woman's Hospital of Illinois; was made professor of gynæcology in the Rush Medical College, Chicago, in 1872; later became president of the College of Physicians and Surgeons in Chicago; and at the time of his death was president of the American Association of Gynæcologists. He was an honorary member of several medical societies and author of numerous papers, among which may be mentioned *Removal of Large Urethro-Vesical Calculus* (1858); *Successful Removal of Both Ovaries* (1866); *Removal of Fibrous Tumor of Uterus* (1872).

JACKSON, Abraham Valentine Williams (1862–). An American Indo-Iranian scholar, born in New York City. He graduated at Columbia in 1883, there held a fellowship in letters from 1883 to 1886, and was instructor in the Anglo-Saxon and Iranian languages from 1887 to 1891. After advanced study at the University of Halle, Germany (1887–89), he was appointed adjunct professor of English language and literature in Columbia (1891). In 1895 he was selected to occupy the chair of Indo-Iranian languages, then newly founded. He became well known as a lecturer on various subjects appertaining to English literature and the Orient, and in 1901, during a visit to India and Ceylon, received special attention from the Parsis, who presented to Columbia a valuable collection of Zoroastrian manuscripts in recognition of the instruction there given by him in their ancient texts. In 1903, 1907, and 1910 he traveled in Persia and Central Asia, and in 1911 again visited India. He was elected a director of the American Oriental Society and published *A Hymn of Zoroaster* (1888); *An Avesta Grammar in Comparison with Sanskrit* (1892); *An Avesta Reader* (1893); *Zoroaster, the Prophet of Ancient Iran* (1898); *Die iranische Religion* (1900); *From Constantinople to the Tomb of Omar Khayyam* (1911); *A Catalogue of the . . . Persian Manuscripts Presented to the Metropolitan Museum . . . by A. S. Cochran* (1914), with A. Yohannan.

JACKSON, Andrew (1767–1845). An American general and seventh President of the United States. He was born March 15, 1767. There has been much controversy between North Carolinians and South Carolinians regarding the place of his birth. There is a tradition that he was born at the Waxhaw Settlement in Union Co., N. C., but Jackson himself thought that he was born near the Waxhaw Creek in Lancaster Co., S. C., and in the opinion of his most thorough biographer "the weight of evidence seems to favor the South Carolinians." His father, Andrew Jackson, a poor farm laborer of Scotch-Irish stock, emigrated from Carrickfergus, Ireland, with his wife in 1765 and settled on Twelve Mile Creek in North Carolina. In 1767, a few days before his son's birth, the elder Jackson died, and his widow immediately removed to the home of her sister, Mrs. James Crawford, in South Carolina. In his boyhood Andrew was a leader among the wild youths of his neighborhood and easily surpassed them in quick temper, quarrelsomeness, and enthusiasm for such sports as cockfighting and horse racing. He had little or no schooling except such as is acquired from rough contact with the world. Though but eight years old when the battle of Lexington occurred, before the war was over he had taken some part, being once captured by the British. The death of his mother from a fever, caught while nursing Americans held in prison at Charleston, and of his two brothers at the hands of the British, left him alone in the world. It is not certain what means of support he had, but after working a few weeks at the saddler's trade, in 1784 he began to study law at Salisbury, N. C. While he was yet under 20 he was admitted to the bar as attorney and counselor, and in 1788 was appointed public prosecutor in the region now forming the State of Tennessee. It was a new and wild country, and in the prosecution of his duties Jackson needed chiefly force and persistence, qualities which gained him strong enemies, but equally strong friends. In 1791 he married Mrs. Rachel Robards, a daughter of John Donelson, one of the pioneer settlers of Tennessee. The marriage was the cause of considerable severe comment, from the fact that the bride had been divorced under peculiar circumstances. The parties took what was only a legislative warrant for a trial to be an actual divorce, and were married two years before the actual divorce was granted. They were married a second time, but the unfortunate matter was a sensitive point to Jackson all his life.

In 1796 he was a member of the convention to frame a constitution for Tennessee. In the same year he was chosen to Congress. His political sympathies were with Jefferson, and he went so far as to incur the condemnation of being one of the 12 who opposed the address to Washington at the close of his administration. While in the House, he secured the payment of a claim which Tennessee had for expenses in an Indian war, adding thereby greatly to his popularity. In 1797 he was elected to a seat in the Senate, but he resigned the next year, having little pleasure in political life. From 1798 to 1804 he was a "Judge of the Supreme Courts" of Tennessee. In 1802 Jackson was chosen major general of the militia over ex-Governor Sevier. On the purchase of Louisiana (1803) Jackson was an unsuccessful applicant for the appointment of Governor. From 1804 to 1811 he was engaged in business, storekeeping, and planting. The abuses of credit in the border State, where there was little money and much land speculation, got him into embarrassments, and his own self-centred personality caused him many quarrels. Besides a quarrel with Sevier he had two duels, in one of which he killed Charles Dickinson, who had been drawn into a quarrel originating in a proposed horse race, and received himself a wound which maimed him for life.

When Burr appeared in the Southwest in 1805, he received cordial support from Jackson until the latter suspected that some disloyalty to the United States was involved. Jackson gave no further help to the enterprise, though he was later convinced of the innocence of Burr's motives, for he appeared as a witness for him at his trial and made a public speech against Jefferson relative to the matter.

The declaration of war against Great Britain in 1812 brought Jackson his opportunity. As soon as he heard the news, he offered his own services and the coöperation of 2070 militia under his control. In January, 1813, he set out under orders for New Orleans, which was regarded as a probable point of attack. In March he was at Natchez, organizing his force with great energy and skill, when suddenly he received orders to disband his forces, neither pay nor rations being furnished for these men, 500 miles from home. Jackson hired transportation on his own responsibility and led his men home in a body. His friend Thomas H. Benton, afterward the Missouri Senator, secured the repayment of this expense, but a slight discord which this good turn might have eased was aggravated by Jackson's standing second for another man in a duel with Jesse Benton, brother of Thomas H. After a fiery quarrel Jackson threatened to horsewhip Thomas H. Benton, and when he met the two brothers in a tavern in Nashville, a bloody fracas took place. Jackson was shot twice, and Jesse Benton was badly stabbed.

Ever since the earliest attempts to remove the Georgia Indians from their territory, there had been intermittent wars. Emboldened by the war between the United States and England, the Creeks in 1813 made further trouble and committed many outrages, the chief of which was the massacre at Fort Mims (q.v.) on August 30. Intense excitement followed, and the whole Southwest was aroused. The Tennessee Legislature called for volunteers and resolved to exterminate the troublesome tribe. In spite of the wound which Jesse Benton had given him, Jackson was soon in the field, and with Colonel Coffee, his former partner, defeated the Indians severely at Talladega and at Tohopeka or Horseshoe Bend on the Tallapoosa River. Jackson distinguished himself in these military operations by his boundless energy. Besides the foe, Jackson had to contend with discord among the officers, insubordination among his men, and scarcity of food, and he manifested not only a sympathetic understanding of the situation, but a great decision of action. This campaign began Jackson's national career; in August, 1814, he was in command at Mobile, a major general in the regular army.

The British attacked Fort Bowyer on Mobile Point, September 14, and were repulsed. They then, entering Spanish territory, retired to Pensacola, which Jackson had already asked orders to attack; acting now on his own responsibility in default of an answer from Washington, Jackson stormed the town with 3000 men. His success was very important, for it now rendered possible the defense of New Orleans, where Jackson arrived Dec. 1, 1814. The place was without defenses, and but for their own slowness and Jackson's almost frenzied energy, the British might easily have taken the town. Jackson proclaimed martial law, made the utmost of his means, and inspired his men with his own enthusiasm. The army was a motley one, being composed of regulars, militia from the neighboring States, a few pirates, and a battalion of negroes. On Jan. 8, 1815, the British made their grand assault on Jackson's works and were repulsed with great slaughter, the Americans having not only the better leadership, but remarkably good fortune due to various accidents. The British withdrew with the loss of their commander, Sir Edward Pakenham, and more than 2000 men. The American loss was only 8 killed and 14 wounded. The treaty of peace had been signed at Ghent, Dec. 24, 1814, two weeks before the battle. This victory was the greatest American success on land during the War of 1812, and the position it gave Jackson was preeminent. Besides his personal popularity among the frontier people, whom he so thoroughly understood, he had now a national reputation. A mutiny in September, 1814, arising from a misunderstanding as to enlistment, resulted finally in the execution of six men in February, 1815. This unprecedented sternness seems to have been justified, but when an attempt was later made to manufacture out of it political capital, Jackson, contrary to his usual method of action, disavowed responsibility. For the arrest of a Judge Hall during the prevalence of martial law Jackson was fined $1000 for contempt, but 30 years later this was refunded by Congress.

In April, 1815, Jackson was appointed commander in chief of the Southern Division, and Congress voted thanks for his services. His next active work was in the war against the Seminoles in Florida, in the course of which occurred another of his acts which created no little excitement. He arrested and put to death, on the charge of inciting the Indians, two British subjects, an English adventurer, Ambrister, and a Scotch trader, Arbuthnot. At the same time Jackson hanged two Indian chiefs and then seized Pensacola (1818), in spite of the remonstrance of the Spaniards. These proceedings created intense excitement in England, but after much angry correspondence there was a peaceable settlement. In Congress Jackson's conduct was very generally condemned, but all attempts to pass a vote of censure failed. On the cession of Florida to the United States he was appointed Governor (1821), and during his brief term of office had some serious difficulties in consequence of the arrest of a judge for issuing a writ of habeas corpus. Efforts in Congress to pass censure for this act were not successful.

The Seminole War closed Jackson's military career, and with no inclination of his own he was again taken into political life. He was elected to a seat in the United States Senate in 1823. In 1822 and again in 1824 the Legislature of Tennessee nominated him for President. At the election the latter year there were four candidates, who received electoral votes as follows: John Quincy Adams, 84; William H. Crawford, 41; Henry Clay, 37; Jackson, 99. No one having a majority, the House of Representatives elected Adams, and Jackson retired to private life. But four years afterward he was supported by all the opponents of the administration and elected by an immense majority, the vote being Jackson, 178; Adams, 83. Calhoun was reelected Vice President. The contest was one of the most personal and bitter in American political history, because Jackson, taking as a personal matter the party slander which accused Adams of buying Clay's support in the preceding election by the promise of the portfolio of State, threw his whole force into the struggle. Jackson was reëlected in 1832, his principal opponent being Henry Clay. In his second term Van Buren was Vice President.

Jackson's eight years' administration of the government meant the rise of the people to power. Jefferson, Madison, Monroe, and even J. Q. Adams had also been affiliated with the Democratic Republican party, but they had been trained statesmen, who administered the government in the interests of all classes. Now a man sprung from the people, relying upon them and thoroughly representing them, held the reins of power. He happened to be more or less of an autocrat, but it was inevitable that his successors would become more and more servants of the people or of the politicians who controlled the people. A new régime much more purely democratic had begun, and it was the people of the Union as a whole, not of the States as units, that had risen to power.

A prominent feature of the new régime was the large number of removals from office, which Jackson may have believed to be necessary to the cleansing of the public service from the corrupting influence of executive patronage. Unfortunately, however, many of his appointments showed that he was not always a good judge of men, and in the pursuit of this policy he unwittingly promoted the evils of the spoils system. (See Civil-Service Reform.) The leading events of Jackson's two administrations were the scandal concerning Mrs. Eaton (see Eaton, Margaret), whereby the cabinet was broken up; the veto of the United States Bank charter; the removal of the deposits of public money from that bank; and particularly the prompt and complete crushing of the nullification movement in South Carolina in 1832. This movement was started in opposition to a high tariff, and Jackson himself was opposed to such a tariff, but he gave South Carolinians to know that while the laws remained unrepealed they should be enforced at any hazard. Before any serious conflict had occurred the matter was settled, chiefly through the influence of Henry Clay. During his second term Jackson was engaged in the bank war. He ordered the Secretary of the Treasury to stop making deposits of public money in the United States Bank and its branches. The cabinet was not favorable to such a policy, and Jackson put William J. Duane at the head of the Treasury; but as he declined to do the required services, he was displaced, and Roger B. Taney was appointed. Taney obeyed Jackson's order, and, in retaliation, the Senate refused to confirm his nomination as Secretary, and he was subsequently made Chief Justice of the United States Supreme Court. Feeling ran so high in this bank war that the Senate passed a resolution of censure on the President, a proceeding unheard of till then. In 1837 this resolution was by vote expunged from the record. The bank war closed in 1836–37; the old bank was not rechartered; and after some time the independent treasury or subtreasury system was invented to take its place as a depository for public money. During Jackson's terms the national debt was entirely paid off; the Indians were removed from Georgia and nearly all of them from Florida; and two States, Arkansas and Michigan, were admitted to the Union. The chief disturbing element was the question of slavery, and the great financial panic of 1837 was just beginning when he left the chair. His personal ascendancy allowed him without opposition to name his successor, Martin Van Buren, who had skillfully won his friendship. On quitting office he published a farewell address and retired to the Hermitage, as his home near Nashville was called, where he passed the remainder of his life, always, however, taking a deep interest in public affairs. He died June 8, 1845.

Jackson seems to have been very amiable when things were going his way, but when opposition arose his violence of temper and action was ungovernable. He was essentially a man of action and not a thinker, although in his often-assailed bank policy he seems to have been nearer right in some respects than his critics. He was, take him all in all, one of the most commanding personalities in American history, but it seems clear that many of his decisions were determined by the way of manipulation by friends—known as the Kitchen Cabinet—who shrewdly used his force and popularity.

Bibliography. The best biography of Jackson is that by J. S. Bassett (2 vols., New York, 1911). Consult also: J. H. Eaton, *Life of Andrew Jackson* (Philadelphia, 1828); William Cobbett, *Life of Andrew Jackson* (New York, 1834); J. T. Headley, *Lives of Winfield Scott and Andrew Jackson* (ib., 1852); Benton, *Thirty Years' View* (ib., 1854); C. E. A. Gayarre, *Sketch of General Jackson by Himself* (New Orleans, 1857); James Parton, *Life of Andrew Jackson* (3 vols., New York, 1861); S. K. Bolton, *Famous American Statesmen* (ib., 1888); Oliver Dyer, *General Andrew Jackson, "Old Hickory"* (ib., 1892); James Parton, *General Jackson* (ib., 1893); Peck, *The Jacksonian Epoch* (ib., 1899); W. G. Sumner, *Andrew Jackson*, in the "American Statesmen Series" (ib., 1899); W. G. Brown, *Andrew Jackson* (Boston, 1900); A. C. Buell, *Life of Andrew Jackson* (2 vols., New York, 1904); A. S. Colyar, *Life and Times of Andrew Jackson* (2 vols., Nashville, 1904); C. T. Brady, *True Andrew Jackson* (Philadelphia, 1906); MacDonald, *Jacksonian Democracy* (New York, 1906); A. H. Lewis, *Andrew Jackson* (ib., 1907); T. E. Watson, *Life and Times of Andrew Jackson* (Thomson, Ga., 1912). The best-known monuments to Andrew Jackson are those by Clark Mills, in Washington with replicas at New Orleans and Nashville, and by John Frazee, in Memphis, Tenn.

JACKSON, Benjamin Daydon (1846–). A noted British botanist, born in London and educated at private schools. He is perhaps best known as the compiler of *Index Kewensis* (q.v.), a reference book on which he worked for nearly 14 years, which appeared from 1893 to 1895 (supp., with Durand, 1901–06), and which was long a standard authority for the names of flowering plants. From 1880 to 1902 he was secretary of the Linnean Society, and then became general secretary. Among his other works are: *Guide to the Literature of Botany* (1881); *Vegetable Technology* (1882); *Glossary of Botanical Terms* (1900; 2d ed., 1905); *Life of George Bentham*, in "English Men of Science" (1906); *Darwiniana* (1910); *Index to the Linnæan Herbarium* (1912); *Catalogue of Linnæan Specimens of Zoölogy* (1913). He also edited works by C. B. Clarke and wrote numerous articles for botanical journals.

JACKSON, Charles (1775–1855). An American jurist. Born at Newburyport, Mass., he graduated at Harvard in 1793, studied law with Chief Justice Parsons, and began to practice in 1796 at Newburyport. In 1803 he removed to Boston, where, associated with Judge Hubbard, he had the most lucrative practice in the State. He was judge of the Massachusetts Supreme Court from 1813 to 1824, a member of the State Constitutional Convention of 1820, and one of the commissioners to revise the State laws in 1833. His *Treatise on the Pleadings and Practice in Real Actions* (1828) is a standard work on the law of property.

JACKSON, Charles Loring (1847–). An American chemist, born in Boston and educated at Harvard, Heidelberg, and Berlin. In 1868 he became assistant, in 1871 assistant professor, and in 1881 professor of chemistry at Harvard. In 1911 he retired. He published a number of papers, mainly on topics of organic chemistry, in the *Proceedings of the American Academy* and in the *American Journal of Science*. He studied the organic compounds of selenium, the preparation of borneol, of the fluorine derivatives of benzoic acid, of benzene-trisulphonic acid, and other important organic substances.

JACKSON, Charles Thomas (1805–80). An American scientist, born at Plymouth, Mass. He graduated at the Harvard Medical School in 1829 and during the last two years of his course made a mineralogical and geological survey of Nova Scotia in company with Francis Alger of Boston. An account of this expedition is contained in the *Memoirs of the American Academy of Arts and Sciences*. He went to Europe in 1829 and spent three years studying in Paris, varied by occasional trips to Germany and Italy. In 1833 be began the practice of medicine in Boston, but soon abandoned it to devote himself to chemistry, mineralogy, and geology. He was State geologist of Maine in 1836, of Rhode Island in 1839, and of New Hampshire in 1840. In 1837 he had a violent controversy with Morse, to whom he claimed to have given the idea of the telegraph. He explored the wilderness on the southern shore of Lake Superior in 1844, and from 1847 till 1849 was United States surveyor of mineral lands in Michigan. He claimed to be the discoverer of the anæsthetic properties of ether, and this involved him in a dispute with Dr. W. T. G. Morton. His claim was supported by many Boston physicians, and a committee appointed by the French Academy of Sciences to investigate the matter decided that both men were entitled to recognition. Dr. Jackson published elaborate reports of his work as a State geologist and as a member of the United States Geological Survey; contributed articles to the *American Journal of Science and Arts*, to the *Comptes Rendus*, and to the *Bulletin de la Société Géologicale de France;* and wrote a *Manual of Etherization, with a History of its Discovery* (1863).

JACKSON, Cyril (c.1858–). An English sociologist and educator, educated at Charterhouse and at New College, Oxford. He studied law; worked at Toynbee Hall from 1885 to 1895, becoming a member of the London School Board in 1891; was inspector general of schools for Western Australia in 1903–06; acting agent general for Western Australia in 1910–11; and in 1913 became an alderman of the London County Council. His important published works are reports on educational and industrial subjects, notably those on "boy labor" and "assistance to the unemployed" in the Report of the Royal Commission on Poor Laws; he also wrote *Unemployment and Trade Unions* (1910) and *Outlines of Education in England* (1914).

JACKSON, Dugald Caleb (1865–). An American electrical engineer. He was born at Kennett Square, Pa., graduated as civil engineer from the Pennsylvania State College in 1885, and studied at Cornell University in 1885–87. He was then vice president and engineer of the Western Engineering Company at Lincoln, Neb., until 1889, for a time was connected with the Edison interests, and then entered private practice as a consulting engineer. In addition to professional duties, from 1891 to 1907 he was also assistant professor of electrical engineering at the University of Wisconsin, and thereafter had charge of the department of electrical engineering at Massachusetts Institute of Technology. In 1905 he was elected president of the Society for the Promotion of Engineering Education, and in 1910 president of the American Institute of Electrical Engineers. He is author of *A Text-Book on Electricity and Magnetism and the Construction of Dynamos* (2 vols., 1893–96) and *Electricity and Magnetism* (1895), and coauthor of *Alternating Currents and Alternating Current Machinery* (1896; rev. ed., 1913) and *An Elementary Book on Electricity and Magnetism and their Applications* (1902).

JACKSON, Fort. See Fort Jackson.

JACKSON, Frederick George (1860–). A British Arctic explorer. He completed his education at the University of Edinburgh. His earliest polar experiences were those of a whaling voyage in 1886–87. In 1893 he made a sledge journey of about 3000 miles, during which he crossed the Siberian tundra (frozen, marshy prairies) between the Obi and the Pechora rivers. In 1894 he was given command of the expedition sent by Mr. Alfred Harmsworth (later Baron Northcliffe) to explore Franz Josef Land exhaustively and to attempt to reach the North Pole. Although the *Windward* was carried farther north than any vessel previously in these waters, the polar attempt was abandoned when Nansen met Jackson on his remarkable retreat from the *Fram*. Remaining at Franz Josef Land from 1894 to 1897, Jackson explored the archipelago between long. 42° and 56° E. and to lat. 81° 20′ N. His observations of the fauna, flora, and physical conditions of Franz Josef Land were extensive and valuable. For this work he was awarded a gold medal by the Geographical Society of Paris and was made Knight of the Royal Order of St. Olaf. Serving in the Boer War, he attained the grade of captain and was later promoted major. His narratives of Arctic travel appeared under the following titles: *The Great Frozen Land* (1895); *A Thousand Days in the Arctic* (1899).

JACKSON, Frederick John Foakes. See Foakes-Jackson.

JACKSON, George (1864-). A Canadian Methodist clergyman and educator. He was born in Grimsby, England, and was educated at the Wesleyan Methodist College, Richmond, and at London University. He began pastoral work in 1887 on Clitheroe Circuit, but in 1888 removed to Edinburgh, where he was pastor of a mission church until 1906. In the latter year he removed to Ontario, and in 1906-09 was pastor of the Sherbourne Street Methodist Church, Toronto. In 1909 he was appointed professor of the English Bible in Victoria University. He resigned in 1913. His publications include: *Judgment, Human and Divine* (1902); *Young Man's Religion; The Old Methodism and the New; Memoranda Paulina: The Teaching of Jesus* (1903); *The Fact of Conversion* (1908); *Studies in the Old Testament* (1909); *The Preacher and the Modern Mind* (1910); *In a Preacher's Study* (1914).

JACKSON, George Thomas (1852-). An American dermatologist, born in New York City, a brother of Samuel Macauley Jackson. He studied at the College of the City of New York, for two years in Berlin, Vienna, and Strassburg, and in 1878 graduated from the College of Physicians and Surgeons, Columbia University. Until 1884 he was in general practice. After that he devoted himself exclusively to dermatology, a subject which he taught at the Woman's Medical College of the New York Infirmary (1890-99), the University of Vermont (1895-1900), and Columbia (instructor, 1890-1908; professor, 1908-13). He is author of: *Diseases of the Hair and Scalp* (1887, rev., 1893); *The Ready Reference Handbook of Diseases of the Skin* (1893; 7th ed., rev., 1914); *Treatise on Diseases of the Hair* (1912), with C. W. McMurtry.

JACKSON, Helen Fiske Hunt (1831-85). An American poet and novelist, better known by her pen name of H. H. She was born at Amherst, Mass., Oct. 18, 1831. Her father was Prof. N. W. Fiske. At 21 she married Major Edward B. Hunt of the United States Engineers, who died in 1863. She married afterward (1875) William S. Jackson, a banker of Colorado Springs, Colo. She died at San Francisco, Aug. 12, 1885. Helen Hunt was educated at Ipswich, Mass., and in New York and began to write for periodicals during her residence as a widow at Newport, R. I. Her poems won her friends, and in 1870 she published a volume of "Verses by H. H.," which was read widely. From this time her pen was constantly employed. The most ambitious of her works are the novels *Mercy Philbrick's Choice* (1876), *Hetty's Strange History* (1877), both in the "No Name Series"; *A Century of Dishonor* (1881), a plea for better treatment of the Indians; and the romance on the same theme entitled *Ramona* (1884). Mrs. Jackson also wrote some books for children, and several posthumous volumes were brought out shortly after her death, among them *Sonnets and Lyrics* (1886). The "Saxe Holm Series" are said to be hers. Her poems probably constitute her best claim to remembrance, and such good judges as Emerson—in the preface to *Parnassus* (1874)—and Thomas Wentworth Higginson have admired her lyrics. For an appreciation of her genius, consult T. W. Higginson, *Contemporaries* (Boston, 1900).

JACKSON, Henry (1839-). An English classical scholar. He was born in Sheffield and was educated at Cheltenham and at Trinity College, Cambridge, of which he became fellow in 1864. From 1875 to 1906 he was prælector in ancient philosophy at Cambridge and then became Regius professor of Greek. He received honorary degrees from St. Andrews, Aberdeen, Glasgow, Oxford, Manchester, Sheffield, and Berlin. His special field being Greek philosophy, particularly Aristotle (the Ethics) and Plato, he contributed articles on Greek philosophers to the *Encyclopædia Britannica* and to classical periodicals and edited the fifth book of Aristotle's *Nicomachean Ethics* (1879) and *Texts to Illustrate the History of Greek Philosophy from Thales to Aristotle* (1901).

JACKSON, Henry Rootes (1820-98). An American diplomat and soldier, born in Athens, Ga. He graduated at Yale in 1839 and in the following year was admitted to the bar in Georgia, where he was for several years United States district attorney. During the Mexican War he commanded the First Regiment of Georgia Volunteers. He was judge of the Superior Court from 1849 to 1853, when he was sent as the United States chargé d'affaires to Vienna. There he was Minister Resident from 1854 until his resignation in 1858. After his return to Georgia he aided the United States district attorney in prosecuting the owners of the slaveship *Wanderer*. Jackson was one of the Democratic delegates who seceded from the Charleston convention in 1860. When his State seceded, he became a colonel on Governor Brown's staff and was active in securing the United States arsenal at Augusta with its stores of arms and ammunition. He was then appointed major general by the Governor and was placed in command of all the State troops, but soon resigned this commission to accept one as brigadier general in the Confederate service and went to western Virginia, where he succeeded General Garnett upon the latter's death. Recalled by Governor Brown to aid in the defense of Georgia's seacoast, and unable to obtain leave of absence from the Richmond authorities, he resigned his Confederate commission and was reappointed by the Governor major general and commander of all the State troops. This office he held until the Georgia State troops were turned over to the Confederacy in 1862, when he was left without a commission. He was not again received into the Confederate service until near the close of the war, when he was made a brigadier general in Hood's army and, after taking part in the battle of Franklin, was captured with his whole brigade in the battle of Nashville (q.v.) and was a prisoner during the remainder of the war. He was appointed United States Minister to Mexico in March, 1885, but resigned about a year later because of his disagreement with the government in the matter of the seizure and sale by the Mexican authorities at Tampico in January, 1884, of the American schooner, *Rebecca*. Secretary Bayard held that the charge against this vessel of attempted smuggling was not substantiated. He published *Tallulah and Other Poems* (1851).

JACKSON, Howell Edmunds (1832–95). An American jurist, born at Paris, Tenn. He graduated at the University of Virginia in 1854 and at the law department of Cumberland University in 1856 and then began to practice law in Jackson, Tenn., removing to Memphis in 1859 and returning to Jackson in 1876. He was strongly opposed to secession, but went with his State, and after the establishment of the Confederacy was appointed receiver for West Tennessee property confiscated by the new government. At the close of the war he became a member of the Tennessee Court of Referees, a provisional Supreme Court created to hear the cases which had accumulated during the Civil War. In 1880 he was elected to the Tennessee Legislature and the next year to the United States Senate, where he served until April, 1886. He resigned to accept the appointment of United States Circuit Court judge for the Sixth Federal Circuit, and in February, 1893, President Harrison appointed him an associate justice of the United States Supreme Court. When stricken with fatal illness, he forced himself to attend the second hearing of the income-tax law, and his vote would have caused it to become effective had not Justice Shiras (q.v.) reversed his previous decision.

JACKSON, James (1757–1806). An American soldier and political leader, born at Moreton-Hampstead, Devonshire, England. He went to Georgia in 1772 and began the study of law. He joined the "Liberty Boys," took part in the defense of Savannah in 1776, was a member of the first constitutional convention of Georgia in 1777, was made brigade major of the Georgia militia in 1778, and again engaged in the defense of Savannah. After its surrender he went to South Carolina, served with Sumter, Pickens, and Morgan, and was publicly thanked by the last named after the battle of Cowpens. He participated in the siege of Augusta and was left in command after the capture in 1781. Later he organized a partisan legion, which he commanded. When Savannah was recaptured, the Legislature voted him the forfeited house of a Tory. In 1788 he was elected Governor, but declined on account of youth and inexperience. He sat in the First Federal Congress and was elected United States Senator in 1793. This office he resigned in 1795, and was elected to the State Senate in order to force the revocation of the Yazoo land grants. He was an influential member of the constitutional convention of 1798 and was elected Governor the same year. In 1801 he returned to the United States Senate and sat until his death. He was a follower of Jefferson in politics.

JACKSON, James (1777–1867). An American physician, brother of Charles Jackson the jurist. He was born in Newburyport, Mass., graduated at Harvard in 1796, and studied medicine with Dr. Holyoke of Salem and in London. In 1800 he began practice in Boston. He was the first physician of the General Hospital in Boston, which, with Dr. Warren, he had established. In 1810 he was chosen professor of clinical medicine in Harvard and in 1812 professor of theory and practice there. He was several times elected president of the Massachusetts Medical Society. He wrote: *On the Brunonian System* (1809); *Remarks on the Medical Effects of Dentition* (1812); *Letters to a Young Physician* (1885). Consult Putnam, *Memoir of Dr. James Jackson* (Boston, 1905).

JACKSON, James Streshly (1823–62). An American soldier, born in Madison Co., Ky. He was graduated at Jefferson College in 1844 and in 1845 at Transylvania University, where he had studied law. He practiced in Kentucky before and after the Mexican War, in which he fought as a lieutenant of volunteers enlisted by himself. He served in the Thirty-seventh Congress from March, 1861, until the following December, when he resigned to enter the Federal army, for which he raised a company of cavalrymen. He became colonel of the Third Kentucky Cavalry on Dec. 13, 1861, and brigadier general of volunteers the following July, and was killed on Oct. 8, 1862, at the battle of Perryville, where he was one of the division commanders under General McCook in the Army of the Ohio.

JACKSON, John (1778–1831). An English portrait painter, born at Lastingham, Yorkshire. His father was a tailor, who brought him up to the same trade; but Lord Musgrave, who met the youth at Whitby, was impressed by his artistic talent and gave him encouragement. Another patron, Sir George Beaumont, lent him a Reynolds to copy and in 1805 gave him £50 a year to study at the Royal Academy, of which he was elected a member in 1817. Between 1804 and 1830 he exhibited 146 pictures at the Academy and 20 at the British Institution. His best portrait is considered to be that of Flaxman. In the National Gallery, London, are his portraits of the Rev. William Holwell Carr and of James Northcote, R.A.; in the National Gallery of British Art, a portrait drawing of David Wilkie, in red chalk on gray paper; in the Print Room of the British Museum, a collection of his drawings. His portraits are better in color than in drawing or characterization.

JACKSON, Sir John (1851–). An English contractor, born in York and educated at Edinburgh, being trained as a civil engineer. He built many public works, including the last section of the Manchester Ship Canal, with C. J. Mills (completed 1893), the London Tower Bridge (1894), the Dover harbor works, the Keyham dockyard extensions at Devonport (1907), the Simons Town (South Africa) harbor works. Jackson was knighted in 1895 and made a Companion of the Victorian Order in 1911. In 1910 he was elected as a Unionist to the House of Commons from Devonport.

JACKSON, John Adams (1825–79). An American sculptor, born at Bath, Me. He studied first in Boston and later with Suisse in Paris, opening a studio in New York on his return to America. At Florence, Italy, in 1853, he modeled busts of Adelaide Phillips and T. Buchanan Read. In 1854, at Boston, he made bust portraits of Wendell Phillips, George S. Hilliard, and Dr. Lyman Beecher. In 1860, being commissioned to make a statue in bronze of Kane the Arctic explorer, he went to Florence to execute the work and continued to reside in Italy. There he produced most of his ideal subjects; among them "Cupid Stringing his Bow," "Peace," "Musidora" and "Il Pastorello," an Italian shepherd boy. His "Eve and the Dead Abel" in the Metropolitan Museum represents him at his best, but lacks strength and originality.

JACKSON, John Hughlings (1834–1911).

A distinguished English neurologist. He received his early medical education in York Medical School; this was followed by a period of study at St. Bartholomew's Hospital, where he received the degrees M.R.C.S. and L.S.A. in 1856. In 1859 he became connected with the London hospital and in 1886 received his master's degree at the University of St. Andrews, where he became lecturer on physiology in 1864. Four years later he delivered the Croonian lectures of the College of Physicians, on "The Evolution and Dissolution of the Nervous System." In 1890 he was Lumleian lecturer, when he took for his theme "Convulsive Seizures," a subject which he had made his own. (See Epilepsy, a certain type of which disease bears his name.) He received honorary degrees from the universities of Glasgow, Edinburgh, Leeds, Bologna, and Ireland. His literary work was extensive and solid and took the form generally of papers delivered before medical societies or published in medical journals. From a list of more than 200 titles the following may be cited: "Convulsions and Epilepsy," contributed in 1868 to *Reynolds' System of Medicine; Cases of Disease of the Nervous System in Patients the Subject of Inherited Syphilis* (London, 1868); *Clinical and Physiological Researches on the Nervous System* (London, 1873); *A Study of Convulsions* (1870); *Some Remarks on the Routine Use of the Ophthalmoscope in Cerebral Disease* (1879). Consult the obituary sketch in the *Lancet* (London, 1911).

JACKSON, Mercy Brisbee (1802–77). An American physician. She was born at Harwich, Mass., and graduated at the New England Female Medical College in 1860, though she had previously practiced at Plymouth and Boston for more than 30 years. She was admitted to the American Institute of Homœopathy in Philadelphia in 1871 and was the first woman to obtain that honor. She afterward became a member of the Massachusetts and the Boston Homœopathic societies and in 1873 was made professor of the diseases of children in the Boston University School of Medicine, which position she was filling at the time of her death. She was married twice—first to the Rev. John Brisbee, and after his death to Capt. Daniel Jackson, of Plymouth. She delivered many lectures on the subjects of temperance and woman suffrage and was a contributor to the *Woman's Journal.*

JACKSON, Patrick Tracy (1780–1847). An American cotton manufacturer, born at Newburyport, Mass., brother of Dr. James Jackson. He was apprenticed to a merchant, made several voyages to the Far East, and engaged afterward at Boston in the India trade, in which he acquired a fortune. With his brother-in-law, Francis C. Lowell, of Boston, he engaged in cotton manufacture and after several experiments succeeded in producing a model from which a power loom was constructed in 1814 by Paul Moody. They purchased their first mill in 1813 at Waltham—the first that converted the raw cotton into cloth. In 1821 he purchased land on the Merrimac River, on which the Merrimac Manufacturing Company erected a number of mills under his auspices. This was the nucleus of the present city of Lowell. In 1830 he obtained a charter for a railroad from Lowell to Boston, which under his direction was completed in 1835. He took a deep interest in the moral and intellectual welfare of his operatives.

JACKSON, Samuel Macauley (1851–1912). An American editor, born in New York City, a brother of George Thomas Jackson. He graduated in 1870 at the College of the City of New York, in 1873 at Union Theological Seminary, and in 1873–75 studied at the University of Leipzig. From 1876 to 1880 he was pastor of the Presbyterian Church at Norwood, N. J., and from 1895 to 1912 professor of Church history in New York University. He was connected as editor or contributor with a number of dictionaries and encyclopædias, including the first edition of the New International Encyclopædia. He was editor in chief of the *Concise Dictionary of Religious Knowledge* (1891), of the "Heroes of the Reformation Series" (9 vols., 1898–1906), of *Handbooks for Practical Workers in Church and Philanthropy* (9 vols., 1899–1904), and of the new *Schaff-Herzog Encyclopædia of Religious Knowledge* (12 vols., 1907–11). For the "Heroes of the Reformation Series," he wrote *Huldreich Zwingli* (1901, 1903), supplemented by *Zwingli Selections* (1901), and by *The Latin Works and the Correspondence of Huldreich Zwingli, together with Selections of his German Works,* in English translation, vol. i (1912).

JACKSON, Sheldon (1834–1909). An American Presbyterian missionary and educator. He was born at Minaville, N. Y., graduated from Union College in 1855 and from Princeton Theological Seminary in 1858, and, entering home mission work, organized the first Presbyterian churches in Wyoming, Montana, Idaho, Utah, and Arizona, and was especially prominent in Alaska. He was made government agent of education in Alaska in 1885; published the *First Annual Report on Education in Alaska* (1886); and conceived and carried out the plan of introducing reindeer into Alaska, working first with private and later with government support. In 1898 he was United States special agent to procure a Lapp colony in Alaska. Jackson was a successful speaker on missions, was moderator of the Presbyterian General Assembly in 1897, was author of *Alaska and Missions on the North Pacific Coast* (1880), and in 1896 assisted in the foundation of a missionary college in Utah. Consult R. L. Stewart, *Sheldon Jackson* (New York, 1908).

JACKSON, Stonewall. See Jackson, Thomas Jonathan.

JACKSON, Thomas (1783–1873). An English Wesleyan clergyman and author, born at Sancton, Yorkshire. He entered the ministry in 1804. From 1824 to 1843, as editor of the *Wesleyan Methodist Magazine* and of the publications of the Methodist Book Concern, he accomplished an immense amount of work. From 1843 to 1862 he was theological tutor at the Richmond Theological Institution. He was twice president of the British Conference. A complete list of his own works includes 40 titles, and the works which he edited 12 more. An authority on all matters pertaining to Methodism and Methodist history, to him we owe the rescue of the manuscripts of the journals of John and Charles Wesley. A large library which he collected relating to early Methodism and especially rich in Wesleyana was presented by William Deering to Garret Biblical Institute, Evanston, Ill. Jackson's principal works are: *The Life of John Goodwin* (1822); *The Centenary of Wesleyan Methodism* (1839); *The Life of Charles Wesley* (2 vols., 1849); *The Journal of Charles*

Wesley (2 vols., 1849); *The Life of R. Newton* (1855). He edited the works of John Wesley (14 vols., 1829–31); *A Collection of Christian Biography* (12 vols., 1837–40); *The Journals of John Wesley* (4 vols., 1864); *The Lives of the Early Methodist Preachers* (6 vols., 1865). Consult his autobiography, *Recollections of my own Life and Times*, edited by B. Frankland (London, 1876).

JACKSON, SIR THOMAS GRAHAM, first BARONET (1835–). An English architect, born in Hampstead. He was educated at Brighton and at Wadham College, Oxford, of which he was a fellow in 1864–80. He studied architecture under Sir George Gilbert Scott and is best known for his academic buildings—e.g., Brasenose College, Lincoln, Corpus Christi, and Trinity at Oxford, the Law Library and Law School, the Archæological Museum, and the Psychological Laboratories at Cambridge, and buildings at Eton, Harrow, Rugby, and Uppingham—and for his restorations, notably, Winchester Cathedral, the Bodleian Library and St. Mary's and All Saints churches, Oxford. He designed bookplates and table glass, doing much to develop English glass blowing. Honorary degrees were conferred on him by Cambridge (1910) and Oxford (1911), and he was made Baronet in 1913. He wrote: *Modern Gothic Architecture* (1873); *Dalmatia, the Quarnero, and Istria* (1887); *Wadham College, Oxford* (1893); *Reason in Architecture* (1906); *Byzantine and Romanesque Architecture* (1913).

JACKSON, THOMAS JONATHAN, generally known as STONEWALL JACKSON (1824–63). A famous American soldier, born Jan. 21, 1824, of Scotch-Irish-English stock, at Clarksburg in western Virginia (now West Virginia). At an early age he was left to the care of an uncle, a farmer and miller, under whom he was trained in business methods and received some opportunity for study. When only 18, he became sheriff of the county, and soon after was admitted to West Point, where in 1846 he graduated No. 18 in a class of 70, which included McClellan, Reno, Gibbon, Pickett, Maury, A. P. Hill, and Wilcox. He was assigned as second lieutenant to the First Artillery, ordered to join Magruder's Battery (then serving in Mexico), almost immediately achieved prominence in the operations under General Scott, and was brevetted captain and major for gallantry at Contreras, Churubusco, and Chapultepec. From 1848 to 1851 he was stationed at Fort Hamilton and first became noted for that strong religious tendency which afterward caused him to be known as the Havelock of the Confederate army. On March 27, 1851, he resigned from the army and became professor of natural and experimental philosophy and artillery tactics in the Virginia Military Institute, at Lexington, Va. He was not a good teacher, but his influence on his students and on those with whom he was closely associated was profound. In 1856 he visited Europe. On April 21, 1861, soon after the outbreak of the Civil War, Jackson was ordered by direction of the Governor of Virginia to report with his corps of cadets at Richmond for active service. He was commissioned a colonel, was placed in command of the Virginia forces, and was sent to Harper's Ferry. In July of the same year his troops were organized into a brigade (afterward the Stonewall Brigade), and he was appointed a brigadier general. When the Confederates under Johnston moved from Harper's Ferry towards Manassas, Jackson's brigade was in the van and among the first to get into position. In the first battle of Bull Run the South Carolinians were sorely pressed, and their commander, General Bee, seeking to encourage them, is said to have cried out, "Look at Jackson—there he stands like a stone wall," thus originating the historic sobriquet. In September Jackson was promoted to be major general and was assigned to command the Confederate forces in the lower Shenandoah valley. The duty assigned him is thus described by General Johnston: "After it became evident that the valley was to be invaded by an army too strong to be encountered by Jackson's division, that officer was instructed to endeavor to employ the invaders in the valley, but without exposing himself to the danger of defeat, by keeping so near the enemy as to keep him from making any considerable detachment to reënforce McClellan, but not so near that he might be compelled to fight." In pursuance of this plan Jackson fell back up the valley before Banks, who occupied Winchester. Late in March, 1862, the Federal forces were withdrawn to Manassas, as an outpost of the defenses of Washington, and were closely followed by Jackson. Underestimating the strength of the Federal rear guard under General Shields, he made a sharp attack (March 23) upon that officer's position at Kernstown, 3 miles south of Winchester, but after a severe struggle of three hours was repulsed, retiring in good order, with the loss of several hundred men and one piece of artillery. While this affair was a reverse to the Confederates, the boldness shown by Jackson confirmed the Federal authorities in the determination to retain McDowell in front of the capital in spite of McClellan's protest. Jackson finally retired to Staunton, from which point (having increased his available force to 16,000 men) he confronted 30,000 men under Banks and Frémont with three columns, attacked the Federal detachments in detail, and succeeded in outmanœuvring them, particularly in the affair at McDowell (May 8). Banks, finding his communications threatened, fell back across the Potomac, closely followed by Jackson. Soon afterward Jackson reoccupied Winchester. About May 30, finding his communications with Richmond threatened by a fresh Federal force under McDowell, he began a rapid and masterly retreat up the valley, halting at certain favorable points and engaging his pursuers successfully, particularly at Cross Keys and Port Republic (June 6, 8, and 9). Jackson's valley campaign was a conspicuous illustration of his characteristics as a leader, the extraordinary mobility of his infantry earning for it the title of foot cavalry.

Early in April, 1862, the Confederate army, under Gen. J. E. Johnston, was lying in front of Richmond. McClellan, at the head of the Army of the Potomac, was marching up the peninsula to invest that city, meeting with but little opposition save at Yorktown and Williamsburg (qq.v.). Gen. R. E. Lee was placed in command of the Confederate forces after the battle of Seven Pines or Fair Oaks (May 31–June 1), in which Johnston had been severely wounded, and one of his first acts was to order General Jackson to join him with his corps. The junction was effected with Jackson's customary promptness and skill, and he suddenly appeared (June 26) at Mechanicsville, upon the right flank of the Federal army, which fell back after a smart engagement to Gaines's Mill, where on the following day the battle was renewed. Jackson's corps took part in the movements attending McClellan's "change of base" and was especially prominent at Malvern Hill (July 1). Soon afterward Jackson confronted General Pope, who with the combined forces of Banks, Shields, and Frémont was assuming the offensive in northern Virginia. He first defeated Banks at Cedar Mountain, near Culpeper, Va., on August 9, and by a rapid and daring flank movement gained Pope's rear and his depot of supplies at Manassas Junction. On August 29–30 the Confederates under Lee and Jackson achieved a decisive victory over Pope in the second battle of Bull Run, which forced him to fall back upon the Potomac. In Lee's invasion of Maryland, which immediately followed, Jackson was detached to capture Harper's Ferry, which fell into his hands, together with more than 11,500 prisoners and considerable matĕrial of war. At Antietam, on September 17, he commanded the Confederate left wing, his corps bearing the brunt of the battle. At Fredericksburg, December 13, Jackson, who had recently been promoted to be lieutenant general, commanded the right of the Army of Northern Virginia and repelled the attack made by Burnside's left grand division under Franklin. In the following spring the new commander of the Army of the Potomac, General Hooker, crossed the Rappahannock and attempted to interpose his command between Lee and Richmond, sending nearly all his cavalry under Stoneman to cut the Confederate communications with Richmond. The Federal forces, drawn up at Chancellorsville, were greatly superior in strength and were strongly intrenched, excepting on the extreme right of their line. Taking advantage of this weakness, Jackson, on May 2, with Lee's consent, withdrew his corps from the front, made a long and rapid detour, came in unobserved on the enemy's right flank (Howard's corps), and, screened by the dense wood, advanced in three lines and burst like a tornado upon the unsuspecting Federals. After a slight effort at resistance the greater part of Howard's corps fled panic-stricken to the rear, hotly pursued by Jackson's men, who were, however, greatly impeded by the underbrush and lost their formation. With a small escort Jackson advanced in front of his lines, between eight and nine o'clock P.M., to reconnoitre. As he was returning, his party was mistaken for Federal cavalry and was fired upon by the Confederates. Jackson was severely wounded in the left arm and right hand. On the following day his left arm was amputated, and he seemed in a fair way to recover; but pneumonia set in, from which he died at Guinea Station, May 10, 1863. Jackson was conspicuous not only for his military ability but also for his personal virtues. Like Cromwell, he blended the devoutness of the Puritan with the severity of the soldier. He never began a battle without a prayer and after a victory publicly gave thanks to God. He was very gentle in his social relations, and he believed in making war with consideration for all noncombatants, but to the bitter end, relentlessly, against all enemies of his cause. He resembled Sheridan in the soundness of his judgment, quickness to seize an advantage, and personal magnetism, but, like that general, the full measure of his capacity was never tested. When Lee heard of his wounds, he exclaimed: "General Jackson has lost his left arm; I have lost my *right* arm."

In accordance with his own wishes, he was buried at Lexington, Va., where a statue and a memorial hall commemorate his connection with the place. There is a monument to his memory in one of the public parks in Richmond, erected by his English admirers; and the spot where he received his death wound is marked by a plain granite shaft bearing his name. Jackson was twice married—first to Miss Eleanor Junkin (died 1854), and second to Miss Mary A. Morrison.

Bibliography. Markinfield Addey, *Stonewall Jackson: Life and Military Career* (New York, 1863); R. L. Dabney, *Life* (ib., 1866); J. E. Cooke, *Stonewall Jackson: A Military Biography* (ib., 1876); M. A. M. Jackson, *Memoirs* (Louisville, 1895); M. L. Williamson, *Life of General Thomas F. Jackson* (Richmond, 1901); G. F. Henderson, *Stonewall Jackson and the Civil War* (2 vols., New York, 1902); McGuire and Christian, *Confederate Cause and Conduct in the War between the States* (Richmond, 1907); H. A. White, *Stonewall Jackson* (Philadelphia, 1909).

JACKSON, WILLIAM LAWIES, first BARON ALLERTON (1840–). An English politician. He was born in Yorkshire, was educated privately and at a school conducted by the Moravians, and entered upon a business career. In 1876 he sought election to the House of Commons as member for Leeds in the Conservative interest, but was defeated. In 1880 he was successful in North Leeds and was returned for that constituency until 1902. His abilities were recognized in 1885 in his appointment as Financial Secretary to the Treasury in Lord Salisbury's first administration, and he held the same office in the second administration of that statesman, formed in 1886. In 1890 he was appointed Privy Councilor and in 1891–92 served as Chief Secretary for Ireland. In 1902 he was created Baron Allerton of Chapel Allerton. While engaged in politics, he maintained his connection with business enterprises and was for many years chairman of the Great Northern Railway Company.

JACKSON SQUARE. A public square of New Orleans, La., formerly the Place d'Armes, and renamed for Andrew Jackson, who in 1815 defeated the British at New Orleans.

JACK′SONVILLE. A city and the county seat of Duval Co., Fla., 14 miles from the Atlantic Ocean and 138 miles by rail southwest of Savannah, Ga., on the St. Johns River, the Florida East Coast Canal, and on the Seaboard Air Line, the Georgia Southern and Florida, the Atlantic Coast Line, the Southern, and the Florida East Coast railroads (Map: Florida, E 1). Connected with New York, Charleston, and other Atlantic coast ports by steamship, it has, since the completion of the improvements in the river, become an important shipping point for lumber, shingles, crossties, cotton, phosphates, kaolin and clay, oranges, garden produce, naval stores, etc. The city has also a considerable wholesale and retail trade and important fruit-growing interests. Prominent among the industrial establishments are the Union Stock Yards, cigar factories, lumber and planing mills, mattress and palmetto-fibre factories, a fertilizer plant, carriage works, iron foundries, brickyards, shipyards, and steam-engineering works. Jacksonville has long been a popular winter resort. It has ten public parks and is well paved, 75 miles of its streets with macadam and vitrified brick. Among the more notable buildings are the government building, city hall, county courthouse, armory, Union Depot, St. Luke's Hospital, United States Marine Hospital, Confederate Soldiers' Home, Daniel Memorial and St. Mary's orphan homes, several fine hotels, a high school, a Carnegie library, and the Central Grammar School. Hemming Park contains a Confederate monument. There are also large ostrich and alligator farms, and a Government Weather Bureau Station. The government is vested in a mayor and city council. A board of nine bond trustees have charge of all municipal plants, but appropriations are fixed by the council. Jacksonville has a 30-foot channel at mean low water to the sea. Work was begun in 1914 on the construction of municipal docks and terminals, which are to cost $1,500,000. The water works and electric-light plant are owned by the municipality. Jacksonville, named in honor of Gen. Andrew Jackson, Florida's first Territorial Governor, was founded in 1822. On May 3, 1901, a fire swept over 148 blocks of the city (450 acres), causing a loss of over $10,000,000. Pop., 1900, 28,429; 1910, 57,699; 1914 (U. S. est.), 70,173.

JACKSONVILLE. A city and the county seat of Morgan Co., Ill., 93 miles north of St. Louis, Mo., on the Chicago and Alton, the Chicago, Peoria, and St. Louis, the Wabash, and the Chicago, Burlington, and Quincy railroads (Map: Illinois, D 6). Primarily a residential place, Jacksonville has numerous colleges and public institutions. It is the seat of Illinois College, founded in 1829 (the first institution of higher learning in the State); Routt College (Catholic); the Illinois Woman's College (Methodist Episcopal), opened in 1847; Illinois Conservatory of Music, connected with Illinois College; Illinois College of Music, connected with Illinois Woman's College; the Jacksonville State Hospital for the Insane; and State institutions for the blind and the deaf and dumb. There are also the Passavant Memorial Hospital, Hospital of Our Saviour, and a Carnegie library. Duncan Park and Nichols Park are here. The city hall, courthouse, and high school are prominent buildings, and Morgan Lake is of interest. The principal industrial establishments include railroad-car shops of the Chicago, Peoria, and St. Louis, woolen and planing mills, brickyards, several large cigar factories, and bridge works. Jacksonville, named in honor of Gen. Andrew Jackson, was founded as the county seat in 1825 and was first incorporated in 1867, this charter being still in operation. The government is of the commission form, the elective officers being a mayor and four commissioners. There are municipal water works and electric-light plant. Pop., 1900, 15,078; 1910, 15,326; 1914 (U. S. est.), 15,431.

JACKSONVILLE. A town in Cherokee Co., Tex., 118 miles southeast of Dallas, on the International and Great Northern, the Texas and New Orleans, and the St. Louis Southwestern railroads (Map: Texas, E 4). It is the seat of the Alexander Collegiate Institute (Methodist) and of the Jacksonville Baptist College. The city is in a fertile agricultural district, is an important fruit and truck-shipping centre, and has oil, saw and planing mills, and basket and crate factories. The water works are owned by the municipality. Pop., 1900, 1568; 1910, 2875.

JACKSON WHITES. A settlement of mixed-blood Indians in northern New Jersey.

JACK SPRAT. A familiar English nursery rhyme, occurring in Halliwell's *Nursery Rhymes*, where Archdeacon Pratt occupies the place of the later hero, Jack Sprat.

JACK'STONES. A game played with five small pebbles, marbles, or pieces of specially shaped metal (iron). The popular forms of the game are as follows: (*a*) All five stones are tossed into the air and caught, so far as is possible, on the back of the hand; or else one of the stones at a time is tossed up and caught in various methods agreed upon. (*b*) Ones.—In this exercise the stones are at first held in the hand; the jack (any one of the five) is then tossed into the air; the remaining four are laid upon the floor, and the jack is caught before it can land. In *Twos*, *Threes*, and *Fours* the stones are picked up, while the jack is in the air, by twos, threes, or fours, as the case may be. Other games with jackstones are *Riding the Elephant*, *Set the Table*, *Peas in the Pod*, and *Horses in the Stable*. According to Aristophanes, jackstones was a girls' game and exceedingly popular. Other ancient writers say the game was originally played with the knucklebones of sheep.

JACK'STRAWS. A game played with from 20 to 100 little sticks of ivory or wood, of uniform size and between 4 and 6 inches in length, carved (with the exception of a few jackstraws which are left perfectly plain) to resemble weapons, implements, tools, etc. The game consists in letting the sticks fall together in a loose heap, each player in turn extricating as many straws as possible (one at a time) without moving perceptibly any other straw. The decision is in favor of the player with the most straws. Originally the name of the game was jerkstraws, and in England it is also called spillikins. In Germany it is known as *Federspiel*, and in France as *Jonchets* or *Honchets* (from *joncher*, to strew).

JACK-TAR. A common term for a sailor, derived from his tarpaulin garments, and frequently shortened to tar.

JACK THE GIANT KILLER. A nursery tale, the subject of which appears in various legends. The English version is adapted from an old British story of Corineus the Trojan, translated by Geoffrey of Monmouth. The theme of the tale is the superiority of skill to force.

JACK THE RIPPER. A name given to the unknown perpetrator of a series of 10 brutal murders which occurred in the East End of London between April and September, 1888.

JACK, jăk, **JAK**, or **JACA**, zhä'kä, **TREE** (East Indian *jaca*), *Artocarpus integrifolia*. An East Indian tree of the same genus as the breadfruit (q.v.), but larger. The fruit, which is very large and weighs from 5 to 50 pounds, sometimes 70 pounds, is produced in great abundance. It resembles the breadfruit, but has a pulp of somewhat unpleasant flavor. It forms a great part of the food of the natives in some parts of India, Ceylon, etc. The seeds, which lie immediately under the rind, are very palatable when roasted. The timber, which is yellowish, strong, and ornamental, is used for almost every purpose and is exported for making musical instruments, cabinetwork, the backs of brushes, marqueterie floors, etc. To supply the demand of it, the tree is being planted in many tropical countries.

JACMEL, or **JACQUEMEL**, zhåk'mĕl'. A seaport town on the south coast of Haiti, situated on a bay of the same name, 30 miles southwest of Port-au-Prince (Map: West Indies, D 3). The streets are generally very narrow, and the houses mostly of wood. The bay is open, and vessels anchor about half a mile from shore and discharge and load by means of lighters. It has a considerable trade with the United States and is visited regularly by the English Royal Mail steamers. The population of the commune is estimated at from 30,000 to 50,000. Jacmel is the residence of a United States consular agent.

JA′COB (Heb. *Ya'aḳōb*, probably 'he supplants,' or 'he deceives,' 'El' being understood as the subject; connected by Gen. xxv. 26 with '*ăkeb*, 'a heel,' and by Gen. xxvii. 36 with the root meaning 'to deceive'). One of the Hebrew patriarchs. The story of Jacob, with numerous insertions, is found in Gen. xxv–l and is as follows: He was one of the two sons born to Isaac and Rebekah. His character, quiet, peaceful, and home-loving, appealed to Rebekah, and she loved him more than she did Esau. Taking advantage of his brother's hunger, he bought his birthright (Gen. xxv. 29–34). Later, instigated by his mother, who had heard of Isaac's purpose to bless Esau, he impersonated his brother and received the blessing intended for the latter. As a consequence, Jacob had to flee from home, receiving another blessing from his father before his departure. By his father's command he went to Padan-Aram, to the house of Laban (Gen. xxvii–xxviii. 5). Here he served seven years for Rachel, but Leah was given to him instead. Undaunted, he served seven years more for Rachel (Gen. xxix). Of his two wives and two maids, Bilhah and Zilpah, Jacob had 12 sons and one daughter (Gen. xxix. 31–xxx. 24; xxxv. 16–18). Finally Jacob made up his mind to return home. His wives readily agreed, and they stole away from Laban, who pursued and caught up with Jacob, but did him no harm (Gen. xxx. 25–xxxi). On the way home he met Esau, who behaved magnanimously (Gen. xxxii–xxxiii. 16). After having put away the strange gods found in his camp, Jacob came to Bethel and made an altar on the place where God had appeared to him when he fled from his brother (Gen. xxxv. 1–15). He finally settled in Palestine, but afterward went to Egypt, where his son Joseph (q.v.) had preceded him (Gen. xxxvii, xlvi). Jacob died in Egypt at the age of 147, but was buried by his sons in the cave of Machpelah (Gen. xlix. 33; l. 13). In the course of his career there were three distinct places in which Yahwe or His messengers appeared to him. When fleeing from Esau, he halted at Bethel (Gen. xxviii) and was there assured in a dream, in which God Himself appeared standing beside a ladder on which heavenly beings ascended and descended, that he should come safely back to his native land. After his return he again visited Bethel, and God once more appeared to him, changed his name to Israel, and announced the future greatness of the Hebrew nation (Gen. xxxv). At Mahanaim he encountered angels of God (Gen. xxxii. 1, 2). Lastly, at Penuel he had an encounter with a divine being, who first fought with him and, when subdued, blessed the patriarch and announced that his name should henceforth be Israel, interpreted as one who prevails in the conflicts with gods and with men (Gen. xxxii. 24–32).

The first notable feature of the undoubtedly composite narrative, viewed as a whole, is the greater abundance of incidents than in the narratives of Abraham and Isaac, and the second is the various cycles of tales embodied in the Jacob narrative. We have in the first place (*a*) a series of Jacob-Esau stories; (*b*) Jacob-Laban stories; (*c*) a series of incidents connected with sanctuaries, Bethel, Mahanaim, Penuel, and Shechem; (*d*) stories of Jacob's children. There are good reasons for supposing that the Jacob-Esau and the Jacob-Laban stories existed independently, but have subsequently been combined. In this process the various incidents have been separated and inserted in the story of Jacob's career at points where they seemed best to fit in. It thus happens that the Jacob-Esau stories are not told consecutively; but after the account of the birth of Jacob and Esau it is explained how Esau lost his birthright, and the flight of Jacob is related (chaps. xxv–xxvii); the Jacob-Laban tales are then introduced (chaps. xxviii–xxxi), ending with a second flight of Jacob, this time from Laban; then the combination of the Jacob-Esau stories is again taken up and brought to a close (xxxii–xxxiii. 17), after which we have a series of miscellaneous incidents in Canaan and Egypt. Interspersed in these three sections of the narrative we encounter the incidents at the sanctuaries Bethel and Mahanaim; the marriages of Jacob and the birth of his children; incidents in the careers of his children, leading to the introduction of an entirely independent cycle of Joseph stories (Gen. xxxvii–xlvii. 1).

The elaborate and complex character of the narrative points to the union of various streams of tradition, and under the circumstances it is not easy to determine the centre to which Jacob belongs. That, like Israel, he is not an individual, but either represents some clan as the eponymous ancestor, or is the name of a local divinity, is thought to be certain; and the fact that in the name of one of the Hyksos kings, Jacob-her (Jacob is satisfied), Jacob appears to be a divine name has been quoted as favoring the latter alternative. The prominence of Bethel in the Jacob-Esau cycle points to this place as at one time at least the home of the tribe or the worshipers of the god. Some scholars think that the figure of Jacob was originally connected with the southern Bethel, or Bethuel, the modern Halasa. (See NEGEB.) The rivalry between Jacob and Esau is more easily understood if this is the case. It reflects the hostility between Hebrews and Edomites (see ESAU; EDOM) which marks the relation between those two groups, conscious throughout their history of the close genealogical ties that bound them together. Just as in the case of Ishmael (q.v.) features are found which place him in a more favorable light than Isaac, so in the Jacob-Esau cycle there is at bottom a series of traditions which originated in the Esau groups, and which Jewish tradition had to reshape so as to remove all features unfavorable to Jacob. The attempt, however, did not succeed altogether; and accordingly Jacob appears actually in the light of a deceiver and, what is more, is obliged to flee from Esau. This flight, if it means anything, points to the discomfiture at some time of the Jacob clan driven from its district by the more powerful Esau. An alliance is entered upon between Jacob and a distinct Aramæan clan, Laban. The marriages of Jacob into four groups and the birth of numerous children indicate the gradual growth and extension of the Jacob clan until it feels itself powerful enough to cut loose from Laban and return to its former haunts.

But the old popular traditions have been made to serve the historical pragmatism. It was deemed necessary to connect the 12 sections of the Hebrew confederacy with patriarchal history, and hence the extension of the Jacob clan is depicted as though the confederates all sprang from him, whereas, as a matter of fact, the Hebrew confederacy represents the combination of heterogeneous elements having less in common than many of the groups have with others who did not join the confederation or were never incorporated into it. The adjustment of tribal traditions to the later religious and historical theory did not proceed without encountering hindrances. To secure the number 12 and make it work right on all occasions was especially difficult, and the narrators are not at all consistent in their method of obtaining this number. It is this attempted adjustment of popular stories, legends, and myths to later theory that accounts for the identification of Jacob with Israel, the eponymous ancestor of the *Bene Israel;* and in this process of elaboration and transformation of old stories it is also important to note the alternating traces of northern and southern Hebrew writers. It was the northern kingdom, formed of 10 tribes, that represented the real Israel; and the identification of Jacob with Israel and the favoritism shown by Jacob to Joseph (the father of Ephraim and Manasseh) represent the work of northern writers, who thus turn out to have had the larger share in the process of reshaping traditions. Rightly interpreted, the story of Jacob thus becomes the key to the history of Jewish tradition. In its details it not only conceals a large amount of valuable material for the earlier traditions of many of the clans forming the Hebrew confederation, but also enables us to trace the gradual progress of the transformation of the material and its adaptation to the purpose of writers imbued with strong likes and dislikes, who viewed the past from a very subjective point of view. To this point of view there must be added a religious theory which is the outcome of an uncompromising confidence in Yahwe and the zealous and exclusive devotion to His service. This theory is, in brief, that Yahwe established His covenant with the patriarchs, and that the history of the people back to its beginnings is an illustration and proof of this covenant. In some respects Jacob is a more important prop to this theory than even Abraham, certainly more important than Isaac. Indeed, it would seem that the story of Jacob thus worked out represents by itself a complete illustration of the theory, and that Abraham and Isaac are tacked on to it as appendices or links by means of which the theory can be joined to another originally independent series of traditions, again reshaped, elaborated, and made to take a definite direction.

Bibliography. For full discussion of the investigations of the Jacob narratives, consult the commentaries on Genesis of Dillmann, Holzinger, Gunkel, Skinner, and Driver, and the Hebrew histories of Wellhausen, Stade, Guthe, Kittel, and Piepenbring; also Stärk, *Studien zur Religions- und Sprachgeschichte des alten Testaments* (Berlin, 1899 et seq.). For the later Jewish legends about Jacob, consult the article "Jacob," in Hamburger, *Real Encyklopaedie für Bibel und Talmud* (Leipzig, 1897), and in The *Jewish Encyclopædia* (New York, 1904). Winckler, in his *Geschichte Israels* (Leipzig, 1895–1900), Stucken, *Astralmythen der Hebräer* (ib., 1896), and Jeremias, *Das alte Testament im Lichte des alten Orients* (ib., 1906), propose a mythological explanation of Jacob; but the theory as a whole has not been accepted, though it may be admitted that some mythical elements may have crept into the narrative.

JACOB, Giles (1686–1744). An English compiler, born at Romsey, Hampshire. He studied law and published a great number of technical works, such as *The Accomplished Conveyancer* (3 vols., 1714) and the *Compleat Chancery-Practiser* (1730), besides his dissertations on rural life, *The Compleat Court-Keeper* (1713), *The Country Gentleman's Vade-Mecum* (1717), *The Compleat Sportsman* (1718), and *The Land Purchaser's Companion* (1720); but his most important work was his *Poetical Register, or Lives and Characters of the English Dramatic Poets* (2 vols., 1719–20).

JACOB, John (1812–58). An English soldier and military author. He was born at Woolavington, Somerset, Jan. 11, 1812, and was educated at Addiscombe. He entered the Bombay Artillery in 1828, served in the Afghan War in 1839, and in 1841 took command of the Sind (or Jacob's) irregular horse, with which he enforced order in Upper Sind and Cutch, and under Napier distinguished himself at Miani and elsewhere. The injustice of William Napier's *Conquest of the Sind* roused Jacob to his own defense and to Outram's. In 1852 he became commandant of the native police of Upper Sind; negotiated a treaty with the Khan of Khelat (1854); in 1857 served under Outram; and, after his departure, was in sole command of the army in Persia. He died Dec. 5, 1858, at Jacobabad, which had been named in his honor. Jacob was a splendid organizer of native troops, an excellent cavalry officer, and the inventor of a rifle and an explosive bullet. He wrote many tracts on the defects of the British army and civil service in India; collected by Pelly, *Views and Opinions of General Jacob* (2d ed., 1858). Consult Shand, *General John Jacob* (London, 1900).

JACOB, zhȧ'kôb', Louis Léon (1768–1854). A French admiral. He was born at Tonnay, Charente, was educated at Rochefort, and volunteered from a clerkship in the marine bureau to the navy (1784). He was promoted to ensign in 1793, commanded the *Ça Ira* in her brave fight against a superior English force (1795), and was taken prisoner. After his release he distinguished himself (1798) against Sir John Warren's fleet and was again captured but soon exchanged. He took part in the campaign in Santo Domingo in 1801, was commandant at Granville (1805) and at Naples (1806), and shared in the battle of Sables d'Olonne. He was made a rear admiral in 1812 and in 1814 defended Rochefort. He was retired on the Restoration, reëntered active service in 1820, was Governor of Guadeloupe from 1823 to 1826, prepared the expedition against Morocco and Algiers (1827), served on the Admiralty Board until 1834, when he became Minister of Marine, and was aid-de-camp to Louis Philippe until 1848. He introduced in 1805 a system of semaphores which was long used in the French navy.

JA′COB, Richard Taylor (1825–1903). An American soldier, born in Oldham Co., Ky. He was educated for a lawyer, but after travels in South America went West in 1846, and there enlisted a body of mounted men to assist General Frémont in taking possession of California. He served in the Civil War as colonel of the Ninth Kentucky Cavalry Regiment, raised by himself. For a time he was with Major General Buell and afterward he joined in the pursuit and capture of Gen. John Morgan. He accompanied General Shackelford on the Tennessee expedition that resulted in the capture of 2500 men under General Fraser at Cumberland Gap and was in the desperate struggle at Bean's Station. He was elected Lieutenant Governor of Kentucky in 1863, bitterly opposed the Emancipation Proclamation, and advocated the election to the presidency of General McClellan. His public criticism of the administration was so violent that he was arrested and conducted to Richmond, but was afterward unconditionally released by President Lincoln.

JACOBA, yȧ-kō′bä, Countess of Holland (1401–36). The daughter and heir of William II, Duke of Bavaria and Count of Holland, she was first married to John, Duke of Touraine and son of Charles VI of France. In 1417 her father and husband both died. Her possessions were disputed first by her uncle, John of Bavaria, Bishop of Liége, and then by John IV, Duke of Brabant, her second husband, whom she married in 1418. Humphrey, Duke of Gloucester, the third husband, whom she married in 1422, at first supported her claims, but three years later deserted her. Her cousin, Philip V, Duke of Burgundy, then claimed the inheritance, and although she rebelled against him in 1432 with the aid of her fourth husband, Francis of Borselen, she was defeated and thereafter had to live in retirement. Consult Paul Lacour, "Une princesse héroïque au XVe siècle," in *Nouvelle Revue*, vol. vii (n. s., Paris, 1900).

JAC′OBÆ′A, JACOBE, yȧ-kō′be, or **JACOBINE**, zhȧ′kō′bēn′ (1558–97). A duchess of Jülich, daughter of the Margrave Philibert of Baden-Baden. Brought up a Catholic by her uncle, Albert of Bavaria, she married in 1585 John William, who, seven years later, succeeded his father as Duke of Jülich and soon after became insane. Jacobæa was accused of dissolute conduct and brought to trial before the Emperor by her enemies; but before he gave sentence she was found murdered in her bed. A German play by Kugler, *Jakobäa* (1850), dramatizes the story. Consult Stieve, *Zur Geschichte der Herzogin Jakobäa von Jülich* (Bonn, 1878), and Max Lassen, "Die Verheiratung der Markgräfin Jakobe von Baden mit Herzog Johann Wilhelm von Jülich-Cleve-Berg, 1581–85," in *Akademie der Wissenschaften, philosophisch-philologische und historische Klasse, Sitzungsberichte* (Munich, 1895).

JAC′OBE′AN ARCHITECTURE. The phase of English Renaissance architecture which developed during the reign of James I (1603–25) was a natural outgrowth of the Elizabethan style and, like it, found its chief expression in manor houses and collegiate buildings. The classic orders were more generally used, but in strangely fantastic and denatured versions; the *gaine*, which in the Elizabethan style was confined to interior decoration and furniture, appeared in place of pilasters on the exterior, together with strapwork and openwork in stone; while all distinctively Gothic details finally disappeared. Bramshill House in Hampshire is a typical example. The interior decoration shows an advance towards Renaissance types, but there was not yet any really classic feeling, and the change from this style to the Palladian introduced by Inigo Jones (q.v.) was abrupt. Consult: C. J. Richardson, *The Architectural Remains of the Reigns of Elizabeth and James I* (London, 1840); R. T. Blomfield, *A Short History of English Renaissance Architecture* (ib., 1897); A. T. Bolton, *Jacobean Architecture and the Work of Inigo Jones in the Earlier Style* (ib., 1911). See Elizabethan Architecture.

JACOB EV′ERTZEN. A quaint book name applied to the small, brightly colored grouper-like West Indian fishes of the genus *Bodianus*, otherwise known as guativeres and by other names. According to Bloch, the fish was named for Jacob Evertzen, a noted Dutch pilot in the middle of the eighteenth century, whose pock-marked face suggested to his fellow sailors the dark-spotted and freckled fishes (especially the *Bodianus guttatus*, the type of the genus). See Guativere.

JACOB FAITHFUL. A novel by Capt. Frederick Marryat (1839), appearing first in the *Metropolitan Magazine*.

JACO′BI, jȧ-kō′bĭ, Abraham (1830–). An eminent German-American physician, born at Hartum, Westphalia, Germany. He studied at the universities of Greifswald, Göttingen, and Bonn, obtaining his degree in medicine from the last-named institution. Because he had been an active participant in the struggle for free Germany in 1848 and thereafter, Jacobi was prosecuted for treason and was kept in Prussian prisons from 1851 to 1853. In the latter year, after spending a few months in Manchester, England, he came to America and established himself in New York City. He took an active part in founding the German dispensary (1857); was chosen (1860) to fill the first chair of diseases of children instituted in the United States, that of the New York Medical College; from 1865 to 1870 filled a similar chair in the medical department of the University of the City of New York (later University and Bellevue Hospital Medical College); helped found the German Hospital of New York (1868); and from 1870 until his retirement in 1902 was clinical professor of the diseases of children in the College of Physicians and Surgeons (Columbia University). He was the first to establish in New York City systematic and special clinics for the diseases of children, and very largely to him is due the recognition of pediatrics as a distinct branch of medicine. In 1895 he was urged to leave New York and become professor of pediatrics in the University of Berlin, but he declined the honor. He was for many years consulting physician to the New York City Department of Health, to the J. Hood Wright Memorial Hospital, and to the New York Skin and Cancer Hospital, and visiting physician to the Nursery and Child's Hospital. He served as physician to the Mount Sinai Hospital from 1860, to the Hebrew Orphan Asylum from 1868, to Bellevue Hospital from 1873, and to Roosevelt Hospital from 1898. In 1896 he was president of the Association of American Physicians and in 1912 president of the American Medical Association.

Dr. Jacobi's writings are very numerous. A great number of his papers, principally on diseases of women and children, were published in medical and other periodicals in America and in Germany. His books include: *Cogitationes de Vita Rerum Naturalium* (1851); *Dentition and its Derangements* (1862); *Infant Diet* (1873; 3d ed., 1875); *A Treatise on Diphtheria* (1880); *The Intestinal Diseases of Infancy and Childhood* (1887); *Therapeutics of Infancy and Childhood* (1895; 3d ed., 1903). His contributions to Noeggerath and Jacobi's *Midwifery and the Diseases of Women and Children* (1859) and his "Hygiene und Pflege der Kinder," in Gerhardt's *Handbuch der Kinderkrankheiten* (1877), are most noteworthy. In 1893 he published two volumes of miscellaneous essays and addresses on a variety of subjects, mostly medical, under the title *Aufsätze, Vorträge, und Reden* (1893); and in 1909 another collection of miscellaneous papers, entitled *Collectanea Jacobi*, was published in 8 volumes. In 1873 he married Miss Mary C. Putnam (see Jacobi, Mary Putnam); his daughter married George McAneny (q.v.).

JACOBI, yä-kō'bē, Friedrich Heinrich (1743–1819). A German philosopher. He was born at Düsseldorf, Jan. 25, 1743, and was educated at Frankfort and Geneva with a view to preparing himself for a mercantile career, which he began in 1762. In 1772 he was appointed councilor of finance for the duchies of Berg and Jülich and, having married a woman of wealth, was enabled to devote himself to literary pursuits. In 1794 he moved to Holstein and in 1804 to Munich, where he had been appointed a member of the newly instituted Academy of Sciences, of which he became president in 1807. He died on March 10, 1819. His writings consist partly of romances and partly of philosophical treatises. The principal are *Woldemar* (2 vols., 1779) and *Eduard Allwills Briefsammlung* (1781), both philosophical romances which attracted much attention in their day, but have now no claim to special recognition, while his philosophical work has still considerable interest. *Ueber die Lehre des Spinoza in Briefen an Mendelssohn* (Breslau, 1785) is a polemic against logical methods of speculation in the search after the higher class of truths; and *David Hume über den Glauben, oder Idealismus und Realismus* (ib., 1787) continues the polemic and makes an attempt to demonstrate that the mind or nature of man possesses another faculty—viz., faith, or intuition—by which the higher truths are as firmly grasped and in the same way as the material world is grasped by it, since sense is incompetent to witness to the independent reality of that world. His collected works, including letters, appeared at Leipzig (6 vols., 1812–24). Further letters were published by Rudolf Zoeppritz (Leipzig, 1869) and by Leitzmann (Halle, 1892). Consult: Deycke, *F. H. Jacobi im Verhältniss zu seinen Zeitgenossen* (Frankfort, 1848); Fricker, *Die Philosophie des Friedrich Heinrich Jacobi* (Augsburg, 1854); Zirngiebl, *F. H. Jacobis Leben, Dichtungen und Denken* (Vienna, 1867); Harms, *Ueber die Lehre von F. H. Jacobi* (Berlin, 1876); Holtzmann, *Ueber Eduard Allwills Briefsammlung* (Jena, 1878); Lévy-Bruhl, "Jacobi et le Spinosisme," in *Revue Philosophique* (Paris, 1894); id., *La philosophie de Jacobi* (ib., 1894); Wilde, *F. H. Jacobi: A Study of the Origin of German Realism* (New York, 1894); Crawford, *Philosophy of F. H. Jacobi* (ib., 1905); Isenberg, *Der Einfluss der Philosophie Charles Bonnets auf F. H. Jacobi* (Tübingen, 1906), containing bibliography.

JACOBI, Hermann Georg (1850–). A German Sanskrit scholar, born at Cologne. He was educated there and at Bonn and Berlin, where he devoted himself to Sanskrit under Gildemeister and Weber. In 1889 he was made professor at Bonn, after serving as professor extraordinary at Münster (1876–85) and professor at Kiel (1885–89). Possibly his most important work is in Indian chronology: "The Computation of Hindu Dates in Inscriptions," published in *Epigraphia Indica* (1892). His dating of the Rig-Veda, *Ueber das Alter des Rigveda* (1893), on astronomical grounds, puts the time much earlier than the usual estimate. His other works, on comparative philology, Prakrit grammar, Sanskrit literature, and Jainism, include, besides contributions to various publications: *Kalpasūtra of Bhadrabāhu* (1879); *Acārānga Sūtra of the Çvetāmbara Jains* (1882); *Sthavirāvalī Charita* (1883–91); and translations of the *Acārānga, Kalpa, Uttarāhyayana*, and *Sutrakṛtāsga Sūtra*, in the *Sacred Books of the East*, vols. xxii and xlv (1884–95); *Ausgewählte Erzählungen in Māhārāshtrī* (1886; Eng. trans., *Hindu Tales*, 1909); *Das Rāmāyaṇa* (1893); *Das Mahābhārata* (1903); *Kompositum und Nebensatz. Studien über die indogermanische Sprachentwicklung* (1897); an edition of the *Samarādityu Sankhsepa* (1905); translations, published in the *Zeitschrift der deutschen morgenländischen Gesellschaft*, such as *Anandavardhanas Dhvanyāloka* (1903), *Umasvati's Tattvarthadighama* (1906), *Ruyyaka's Alamkarasarvasva* (1908), and many others.

JACOBI, Johann Georg (1740–1814). A German poet, brother of Friedrich Heinrich, born at Düsseldorf and educated at Göttingen. He was appointed professor of philosophy and oratory at Halle (1766) and soon afterward made the acquaintance of Gleim (q.v.), with whom he edited *Iris* (1774–76), to which Goethe, Heinse, Lenz, Sophie La Roche, and others were contributors. He was made professor at Freiburg in 1784. Jacobi's poetic style was sentimental and effeminate, save in a few of his last works. His collected works, with a biography by Von Ittner, one of his friends, were published at Zurich (8 vols., 1807–22); his correspondence with Gleim appeared in 1786; and Martin edited *Ungedruckte Briefe von und an Johann Georg Jacobi* (Strassburg, 1874). Consult: J. A. von Ittner, a biography in J. G. Jacobi, *Sämmtliche Werke*, vol. viii (Zurich, 1822); Georg Ransohoff, *Ueber Johann Georg Jacobis Jugendwerke* (Berlin, 1892); Joseph Longo, *Laurence Sterne and J. G. Jacobi* (Vienna, 1898).

JACOBI, Karl Gustav Jakob (1804–51). A German mathematician, the brother of Moritz Hermann Jacobi the physicist. He was born in Potsdam, studied in Berlin, and began his teaching there as privatdocent in 1824, but soon after went as professor of mathematics to Königsberg. He became a member of the Prussian Academy of Sciences in 1836 and in 1842 took up his permanent residence in Berlin, lecturing at the university. Jacobi's great work was in the theory of elliptic functions, of which he and Abel (q.v.) were the founders. He also contributed to the theory of numbers, to analytical mechanics, and to the study of determinants.

A very important determinant bears the name Jacobian. (See DETERMINANTS.) He also founded the theory of Abelian functions. The following important works appeared in his lifetime: *Fundamenta Nova Theoriæ Functionum Ellipticarum* (1829); *Canon Arithmeticus* (1839); *De Formatione et Proprietatibus Determinantium* (1841; ed. by Stäckel, 1896); *Mathematische Werke* (3 vols., partly posthumous, 1846–71). His *Vorlesungen über Dynamik* was published posthumously (1866; 2d ed., 1884). His *Gesammelte Werke* (7 vols. and suppl., 1881–91) were published by the Berlin Academy. His essay, *Über die vierfach periodischen Functionen zweier Variabeln*, etc., was translated from the Latin and edited by Weber (1895). Consult Lejeune-Dirichlet, "Gedächtnisrede auf Jacobi," in the *Abhandlungen der Berliner Akademie* (Berlin, 1852; printed in Jacobi's *Gesammelte Werke*, vol. i, ib., 1881), and Königsberger, *Carl Gustav Jacob Jacobi* (Leipzig, 1904).

JACOBI, jȧ-kō′bĭ, MARY PUTNAM (1842–1906). An American physician, born in London, England, the daughter of George P. Putnam (q.v.). She was the first woman to graduate from the New York College of Pharmacy, in 1862, and from the Women's Medical College of Philadelphia, in 1864. After teaching in New Orleans and writing for a year, she went to Paris, spent 18 months in hospitals there, was admitted by the Minister of Public Instruction to the Ecole de Médecine, and graduated in 1871, receiving the second prize for her thesis. She returned to New York to begin practice and to act as lecturer on therapeutics in the new Women's Medical College of the New York Infirmary. In 1873 she was married to the physician Abraham Jacobi (q.v.). Upon the founding of the New York Post-Graduate Medical School (1881) she became clinical professor of diseases of children; she served as visiting physician to the New York Infirmary and to St. Mark's Hospital; in 1874 she organized, and became president of, an association for the advancement of the medical education of women; and she was the first woman admitted to the New York medical societies and to the American Medical Association. Her writing on medical subjects was considerable and important. Harvard University awarded her the Boylston essay prize in 1876, and in 1891, when she contributed to *Women's Work in America*, she could record for herself, in the bibliography devoted to the writings of American women physicians, more than 40 titles of papers and treatises. Her books include: *The Question of Rest for Women during Menstruation* (1877); *Acute Fatty Degeneration of New-Born* (1878); *The Value of Life* (1879); *Cold Pack and Anæmia* (1880); *The Prophylaxis of Insanity* (1881); *Hysteria and Other Essays* (1888); *Common Sense Applied to Woman's Suffrage* (1894).

JACOBI, yȧ-kō′bė, MORITZ HERMANN (1801–74). A German physicist and architect, brother of Karl Gustav Jacobi. He was born at Potsdam. In 1835 he became professor of architecture at the University of Dorpat. Two years later he was called to St. Petersburg, where he became a member of the Academy of Sciences in 1842. He carried out numerous important researches in physics and suggested as a practical unit of resistance a copper wire of given dimensions. He also discovered (1850) that the action of the dynamo was but the converse of the motor. He wrote *Mémoire sur l'application de l'électromagnétisme au mouvement des machines*, a remarkable essay published in 1835, and *Die Galvanoplastik* (1840). Consult Wild, *Zum Gedächtnis an Moritz Hermann Jacobi* (St. Petersburg, 1876).

JAC′OBIN. A small, highly artificial pigeon, resembling the capuchin, in which the prolonged upright feathers of the neck and head form a sort of cowl about the face. See PIGEON, and Colored Plate of PIGEONS.

JACOBINE. See JACOBÆA.

JACOBINI, yä′kō-bē′nė, LUDOVICO (1832–87). An Italian cardinal and diplomat of the Roman Catholic church, born at Genzano. He was nephew of the Papal Minister of Public Works and was rapidly advanced in ecclesiastical honors. In 1870 he became Undersecretary of State, and in 1874 was made Archbishop of Thessalonica (Saloniki) in partibus. In the same year he was Nuncio to Vienna, where he first showed his diplomatic abilities. In 1879 he met Bismarck to obtain the revocation of the Falk laws passed by the Prussian Diet against the Catholics in 1873, a mission in which he was ultimately successful. He was appointed Cardinal in 1879, and in 1880 was made Papal Secretary of State.

JACOBINS, jăk′ō-bĭnz, *Fr. pron.* zhȧ′kō′băɴ′. A political club in France which exercised a profound influence on the progress of the French Revolution. It was organized at Versailles in May, 1789, by the representatives from the provinces to the States-General. It comprised in the beginning about 75 members, of whom some two-thirds belonged to the Third Estate and the rest to the clergy, and included among its members some of the most prominent leaders of the time, like Mirabeau, Barnave, Sieyès, Robespierre, Pétion, and the brothers Lameth. It met very frequently and in secret session for the purpose of deciding upon common action to be taken in the National Assembly, and it is probable that the great event of Aug. 4, 1789—the abolition of feudal privileges—and the enunciation of the Rights of Man were planned beforehand in the sessions of the club. Upon the removal of the National Assembly to Paris the sessions of the club were suspended for a time. In the winter of 1789–90 they were resumed in the refectory of the Jacobin convent in the Rue Saint-Honoré, whence the members of the club were derisively called by their opponents Jacobins. The name was changed from Club Breton to Société des Amis de la Constitution. Membership in the club was limited at first to deputies of the National Assembly, but soon the club was thrown open to prominent Parisians in the various walks of life whose sympathies were with the Revolution, and such men as Marie-Joseph Chénier, La Harpe, Cabanis, Lacépède, David, and Fabre d'Eglantine now joined the Jacobins. At this time the club was rather moderately radical, favoring merely constitutional monarchy. After May, 1791, the meetings of the club were held in the chapel of the convent. In November, 1791, its membership numbered more than 1200. The proceedings of the club were published after October, 1791. It had been the intention of the founders to make the club a nucleus for similar societies to be organized throughout France, and this object was speedily carried out. Affiliated societies sprang up in all the towns and in many villages, and these at all times remained in close touch with the mother society. In May, 1791, the number of such societies was more than 400, and in the spring of 1794 it verged closely on 1000. The Jacobin leaders in Paris were able in this manner to carry on a most effective propaganda throughout the country, and, in fact, the perfection of their organization was such as to give the Jacobins the aspect of a political machine.

The attempted flight of Louis XVI in 1791 produced the same effect upon the Jacobin Club as it did upon the nation at large. The radical element began to gain the upper hand, and though it was still professedly monarchic in tone, the question of the deposition of Louis XVI was seriously raised. Upon this point the club split. In the hall of the Jacobins was drawn up the petition demanding the deposition of Louis XVI which brought about the massacre in the Champ de Mars on July 17. Although the leaders of the Jacobins disavowed all responsibility for the document, which they declared had been drawn up by a crowd that invaded the hall, the sanguinary outcome produced a schism in the club. The majority of members, including the most prominent leaders, seceded to form the club of Feuillants (q.v.), and of those who remained, Robespierre and Pétion were the most prominent. The Jacobins now entered upon a new phase, that of violent Republican propaganda. Together with the Girondists (q.v.) they planned the uprising of Aug. 10, 1792, the object of which was the overthrow of the monarchy. With the meeting of the Convention (September, 1792) the strife of parties began, Jacobins against Girondists. The former, as the representatives of uncompromising democracy, showed themselves the more fit to cope with the dangers of foreign invasion and internal insurrection which now confronted France. In the struggle against the Girondists they brought to bear upon the Convention the force of organized public opinion skillfully directed by the various societies throughout the country acting in implicit obedience to the mother society in Paris. With the fall of the Girondists the Jacobins became the practical rulers of France. No important action was taken in the Convention which had not been previously discussed in the sessions of the club, and, as a matter of fact, the meetings of the club came to be popularly regarded with greater interest than the sessions of the Convention. Of equal importance with the influence which it exercised upon the legislative activity of the Convention was the supervision which it exercised over the representatives of the government in the provinces. Its spies were constantly on the watch against treason to the Republican cause, and in many places where the action of the government officials seemed to lack the requisite revolutionary fervor the local Jacobin societies assumed virtual control. By this time the club, of course, had become thoroughly democratic, though perhaps the character of its members raised it above the mob contingents of Hébert and Collot d'Herbois. Robespierre became its master after the overthrow of Danton, and, with the Committee of Safety, it was one of the most efficient instruments in carrying out the Terror. The success of the Jacobins was due mainly to the fact that it always knew what to do and hesitated at nothing in order to do it. In the series of crises that confronted France during the Revolution, the Jacobins presented a solid front to the enemies without and to the traitors within. Success condoned many of their terrible deeds in the eyes of the patriotic revolutionaries. With the fall of Robespierre the importance of the Jacobins ceased. Its sessions were suspended for a time, resumed, and again abandoned. On Nov. 11, 1794, its hall was closed by order of the Convention. Once more reconstituted and meeting at the Panthéon, its sessions were forbidden by the Directory in February, 1796. In the provinces there was a short revival of Jacobin activity in 1799.

Bibliography. A great mass of literature concerning the Jacobins appeared between the years 1790 and 1796, the most important contributions being the *Journal des Amis de la Constitution* (Paris, 1790–93), the *Journal de la Montagne* (ib., 1794–95), and William Playfair, *History of Jacobinism* (2 vols., Philadelphia, 1796). There were also numerous pamphlets and poems published, such as *La Jacobinade, Le secret des Jacobins, Les crimes des Jacobins.* Of modern authorities, the best and most detailed is F. V. A. Aulard, *La Société des Jacobins* (4 vols., Paris, 1889–95). Consult also: Augustin Barruel, *Mémoires pour servir à l'histoire du Jacobinisme* (5 vols., Hamburg, 1803); Zinkeisen, *Der Jakobinerklub* (2 vols., Berlin, 1852–53); W. A. Schmidt, *Tableaux de la Révolution française* (3 vols., Leipzig, 1867–70); F. V. A. Aulard, *The French Revolution: A Political History, 1789–1804,* translated from the French by B. Miall (4 vols., New York, 1910). See FRANCE; ROBESPIERRE; DANTON; together with the works cited under these titles.

JAC'OBITES (from Lat. *Jacobus*, James). The name given to the adherents of the male line of the house of Stuart in Great Britain and Ireland after the revolution of 1688. Many of the more devoted royalists followed James II into France, but the greater part of the Jacobites remaining in their native land made a show of submission to the new government, while secretly supporting the cause of the Pretender. Their intrigues and conspiracies were incessant till the middle of the eighteenth century. Their hostility to the house of Hanover broke out in rebellions in 1715 and 1745, in consequence of which several of them lost their lives upon the scaffold, titles were attainted, and estates confiscated. After the overthrow of the Young Pretender at Culloden in 1746 their cause became so hopeless that it was not long before their activity ceased altogether; those who still retained their attachment to the exiled family finally acquiesced in the order of things established by the Revolution. In Scotland, where they were most numerous, the hopes and wishes of the Jacobite party were expressed in many spirited songs, which form an interesting part of the national literature. The Jacobites of England were also called Tories. They were generally distinguished by warm attachment to the Church of England, as opposed to all dissent, if they were not members of the Catholic church, and held very strongly the doctrine of nonresistance, or the duty of absolute submission to the King. The Jacobites of Scotland were also generally Episcopalians and Roman Catholics. In Ireland the Jacobite cause was that also of the Celts as opposed to the Saxons, or the native race against the English colonists, and of the Roman Catholics against the Protestants. These diversities prevented a complete union and greatly weakened the Jacobites.

Bibliography. James Hogg, *Jacobite Relics* (Edinburgh, 1819–21); Chambers, *Jacobite Memoirs* (ib., 1824); J. Allardyce (ed.), *Historical Papers Relating to the Jacobite Period* (Aberdeen, 1895–96); Terry, *The Rising of 1745, with a Bibliography of Jacobite History* (London, 1900); F. W. Head, *The Fallen Stuarts* (Cambridge, 1901); Marquis de Ruvigny, *Jacobite Peerage* (Edinburgh, 1904); Vaughan, *The Last of the Royal Stuarts* (London, 1906); Hale, *James Francis Edward, the Old Chevalier* (ib., 1907); Grew, *The English Court in Exile* (ib., 1911).

JACOBITES. A name given to the Oriental sect of Monophysites (q.v.), belonging more especially to the Monophysites of Syria, Mesopotamia, and Babylonia, or the Old Syrian church. It is derived from a Syrian monk called Jacobus Baradæus (*Baradai*, 'ragged,' because he often traveled in the guise of a ragged beggar), who formed the Monophysite recusants of his country into a single party. He was chosen Bishop of Edessa in 541 and for more than 30 years traveled through Asia Minor and the East, organizing churches and ordaining bishops, priests, and deacons. The Jacobites were the Syrian national church, and during the Middle Ages were strong. Later many went to the Roman church (see *Uniats*), and now these number only about 80,000. At their head is the separate Patriarch of Antioch, whose choice must be confirmed by the Sultan. Under him are eight metropolitans and three bishops. Of the former, one, the Metropolitan of Jerusalem, called the Maphrian, ranks higher than the others. Both Patriarch and Maphrian live at the monastery of Zaferan, near Mardin. The Jacobites have monks, but no nuns. Their Monophysitic views make them heretics to the Greek church, but they have only minute ceremonial differences from the latter. They are in fellowship with the Coptic church. (See Copts.) Since 1874 the Church of England has carried on mission work among the Jacobites. Consult W. F. Adeney, *The Greek and Eastern Churches* (New York, 1908), and F. J. Bliss, *The Religions of Modern Syria and Palestine* (ib., 1912).

JACOB OF EDES'SA (c.640–708). An eminent theologian and Syriac writer. He was born near Antioch. In early life he entered the monastic order and studied for a while in Alexandria. He was appointed Bishop of Edessa about 686, but resigned his office after four years, because of the insubordination of some of his clergy. He retired first to a monastery near Edessa and then, after 11 years, to one near Antioch. He applied himself to the study of the Syriac version of the Old Testament, revising the text and making many annotations. He had a thorough knowledge of Hebrew, Syriac, and Greek, and for his able translation of Syriac works into Greek he received the surname of "Interpreter of the Books." In his own country he was best known as a grammarian. In 708 he was induced to resume his see, but died four months later. Consult Kayser, *Die Kanones Jakobs von Edessa übersetzt und erläutert* (Leipzig, 1886), with biographical sketch, and William Wright, *Short History of Syriac Literature* (London, 1894).

JACOB OF HUNGARY. See Pastorels.

JACOB OF SARUG (SĔRŪGH) (451–521). A Syriac writer, born at Kurtam on the Euphrates. When Amid was captured by the Persians in 503, he was a visiting presbyter at Haura in Sarug, and in 519 he became Bishop of Batnân in the same district. He is chiefly remembered as the author of some 763 metrical homilies. Most of his works are in manuscript, but in 1903–08 four volumes of his *Homiliæ Selectæ* were published at Paris and Leipzig.

JACOB OF TODI, tō'dē. See Jacopone da Todi.

JACOB OF VITRY, vē'trē', or **JACQUES** (c.1180–1240). Bishop of Acre and Cardinal Bishop of Frascati. He was born probably at Vitry, northern France. He studied in Paris, and was consecrated a priest there in 1210. For several years he lived at Oignies, a place in the present Belgian Province of Namur, attracted by the fame for piety and holiness of the Beguine Maria of Oignies. At Oignies he joined the Order of St. Augustine. At the request of the Pope he preached against the Albigenses, and afterward he preached a new crusade. His preaching was so successful that he was chosen Bishop of Acre in 1214 and consecrated in 1216 by Pope Honorius III. He fulfilled the duties of his bishopric with energy and success, in particular buying Christian slaves from the Saracens and caring for Mohammedan children who had fallen into Christian hands. Difficulties arising with the secular officials, he resigned his bishopric in 1225 and returned to Oignies. In 1227 Gregory IX made him Cardinal Bishop of Frascati. He died in Rome, May 1, 1240. Jacob was justly famed as a preacher in his own time and in later times is remembered as an historian and authority for manners and social conditions of the early thirteenth century. His great work was the *Historia Orientalis*, also called *Historia Hierosolymitana Abbreviata*. He also wrote a life of St. Maria of Oignies. His letters are interesting and valuable recitals of events of the Fifth Crusade, and his sermons have served as the model for many a preacher. A French translation of his *Historia* is in Guigot, *Collection des mémoires*, vol. xxii. Consult Barroux, *Jacques de Vitry* (Paris, 1885).

JACOB OM'NIUM. The pen name of the English essayist Matthew James Higgins (q.v.).

JACOBS, yä'kōps, Albert Michel (1812–79). A Belgian marine painter, born at Antwerp. He studied at the Antwerp Academy, where in 1843 he was appointed professor. The National Gallery in Berlin contains his "Grecian Archipelago" (1848); the New Pinakothek in Munich, "Foundering of the Emigrant Ship *Floridian* on the Coast of Essex," "Sunrise in the Archipelago" (1852), and "View of the Harbor of Constantinople"; and the Museum at Brussels, "Waterfall of the Glommen in Norway" (1855).

JACOBS, yä'kōps, Christian Friedrich Wilhelm (1764–1847). An eminent German classical scholar, born at Gotha. After studying at the universities of Jena and Göttingen, he was made an instructor in the Gymnasium at Gotha (1785). After 1802 he held a position in the public library of the same city. In 1807 he was appointed a teacher of classical literature at the Munich Lyceum, and a member of the Academy of Sciences of that city, but returned to Gotha in 1810 as chief librarian and director of the collection of numismatics and antiques. From 1831 to 1842 he was director of the art collections of Gotha. Besides many editions of ancient writers, including the *Antehomerica* of Tzetzes (1793), *Ælian* (1832), *Achilles Tatius* (2 vols., 1821), and the *Imagines* of Philostratus (1825), with Welcker, his numerous works include an edition of the *Anthologia Græca* (13 vols., 1794–1814), his most important classical work, remarkable for its profound learning and elegance of style, followed by a revised text, in three volumes, made from the Palatine manuscript (see ANTHOLOGY, 1); metrical translations of 700 poems of the *Anthology*, published under the title of *Tempe* (2 vols., 1803); translations from Demosthenes, *Staatsreden und Rede für die Krone* (1805); an elementary book on Greek, *Elementarbuch der griechischen Sprache* (1805; frequently republished); and numerous miscellaneous essays on classical philology, collected under the title *Vermischte Schriften* (vols. i–iii, 1823–24; vols. iv–viii, 1829–44). Of the later works, his *Geschichte des weiblichen Geschlechts* (vol. iv) is best known. Consult his sketch of himself in his *Personalien* (Leipzig, 1840); Wüstemann, *Friderici Jacobsii Laudatio* (1848) and *Hellas* (Berlin, 1852); Sandys, *A History of Classical Scholarship*, vol. iii (Cambridge, 1908).

JA'COBS, Henry Eyster (1844–). An American educator and Lutheran theologian, born at Gettysburg, Pa. He graduated from Pennsylvania College in 1862 and from the Lutheran Theological Seminary at Gettysburg three years later. Between 1870 and 1883 he was professor at Pennsylvania College, successively of Latin and history, ancient languages, and Greek. He was then appointed professor of systematic theology in the Mount Airy Seminary, Philadelphia, where he also assumed the office of dean in the following year. He served as president of his church's board of foreign missions (1902–07), of the General Conference of Lutherans (1899, 1902, 1904), of the American Society of Church History (1907–08), and of the Pennsylvania German Society (1910–11). Besides translating various German theological works and editing the *Lutheran Church Review* (1882–96), a *Lutheran Commentary* (1895–98), and a *Lutheran Encyclopædia* (1899), he wrote: *The Lutheran Movement in England* (1891); *History of the Lutheran Church in America* (1893); *Elements of Religion* (1894); commentaries on Romans (1896) and 1 Corinthians (1897); *Life of Martin Luther* (1898); *The German Emigration to America, 1709–40* (1899); *Summary of the Christian Faith* (1905).

JACOBS, Joseph (1854–). A British-American author, born at Sydney, Australia. He graduated from St. John's College, Cambridge, in 1876, traveled in Spain (1888) and in the United States (1896), and is best known for his work in history and folklore. In 1900 he came to New York to become an editor of the *Jewish Encyclopædia*, which was completed in 1906. He served as president of the Jewish Historical Society and from 1906 to 1913 was professor of English literature and rhetoric in the Jewish Theological Seminary of America. Among his publications are: *English Fairy Tales* (1890); *Celtic Fairy Tales* (1891, 1894); *Indian Fairy Tales* (1892); *Æsop's Fables* (1894); *As Others Saw Him* (1895), a life of Christ from the Jewish standpoint; *Reynard the Fox* (1895); *Literary Studies* (1895); *Jewish Ideals* (1896). His scholarly editorial work includes Carton's *Æsop* (1889); Day's *Daphnis and Chloe* (1890); Painter's *Palace of Pleasure* (1891); Howell's *Familiar Letters* (1892). In addition, he translated Gracian's *Art of Worldly Wisdom* (1892) from the Spanish and (1899) certain tales from Boccaccio; for some time he edited *Folk-Lore*, and was editor of the *Jewish Year Book* (1896–99), the *Literary Year Book* (1898–99), and the *American Hebrew* (1906).

JACOBS, Michael (1808–71). An American Lutheran clergyman and educator, born near Waynesboro, Franklin Co., Pa., and educated at Jefferson College, Canonsburg, where he graduated in 1828. In 1829 he became an instructor in Gettysburg Gymnasium (later Pennsylvania College) and was professor from 1832 till his retirement in 1865. He also entered the Lutheran ministry in 1832 and was prominent in the West Pennsylvanian Synod. A man of varied attainments, Jacobs invented (1845) a new method of canning fruit, made original studies in meteorology, contributed to the publications of the Smithsonian Institution, and wrote *The Rebel Invasion of Maryland and Pennsylvania* (1863).

JACOBS, yä'kôps, Victor (1838–91). A Belgian statesman and leader of the Clericals, born at Antwerp and educated in France, at the Jesuit College at Vaugirard, and the University of Brussels, where he studied law. He was elected deputy in 1863, having taken advantage of the popular disaffection to compulsory service in the army to strengthen the Catholic party; became Minister of Public Works and of Finance in 1870; and in 1884 received the portfolio of Interior and Public Instruction. While he held this post, Jacobs passed the denominational education bill which put the religious orders again in power and which forced its author from the government. But he was still manager and head of the Clerical party and presided at the Catholic congress at Malines only a short time before his death. He wrote several legal studies, including *Le droit maritime belge* (2 vols., 1889–91).

JA'COBS, W. W. (1863–). An English novelist of seafaring people, born in London and educated at private schools. In 1883 he entered the Civil Service, Savings Bank Department. During this period and after he wrote: *Many Cargoes* (1896); *The Skipper's Wooing* (1897); *Sea Urchins* (1898); *A Master of Craft* (1900); *Light Freights* (1901); *At Sunwich Port* (1902); *The Lady of the Barge* (1902); *Odd Craft* (1903); *Dialstone Lane* (1904); *Captains All* (1905); *Short Cruises* (1907); *Salthaven* (1908); *Sailors' Knots* (1909); *Ship's Company* (1911); *Night Watches* (1914). With Louis N. Parker he wrote also a three-act play, *Beauty and the Barge*, in which Cyril Maude played in New York in 1913.

JACOBS CAVERN. A natural cave, about 2 miles east of Pineville, McDonald Co., Mo., named in honor of its discoverer, E. H. Jacobs, of Bentonville, Ark. In 1903 the cavern was carefully examined by Jacobs and Profs. W. K. Moorehead and Charles Peabody. The surrounding rock formation was found to be St. Joe limestone, of the Subcarboniferous age. The opening is slightly more than 21 meters long by about 14 meters deep; the height of the roof from 1.20 meters to 2.60. Lines of stratification show plainly in the walls; the roof is of solid limestone. Dripstone appears in the walls and in the deep bed of ashes on the floor. In these ashes were found a number of hammerstones, horn or bone awls, flint knives, charcoal, six human skeletons, and the bones of various large and small mammals, none of them yet extinct. The occupants are believed to have antedated the mound builders. Examination of the stalagmite formations indicates that the implements had been lying in the ashes for about 1900 years. Some of the relics found in the cavern are deposited in the Museum of Phillips Academy, at Andover, Mass., and are described by Professors Moorehead and Peabody in *Bulletin No. 1* of the Department of Archæology of that institution. Consult also the articles by Professor Peabody in the *American Anthropologist* for September, 1903, and by C. N. Gould in *Science* for July 31, 1903.

JACOBSEN, yä′kôb-sen, Jens Peter (1847–85). A Danish novelist, born at Thisted in Jutland. He first became known as a botanist and as a translator of Darwin. In 1872 he published his novel *Mogens* (republished in a collection, 1882), followed by *Et Skudd i Taagen* (1875), and then *Fru Marie Grubbe* (1876), a fine study of seventeenth-century life. *Niels Lyhne* (1880) is modern, skeptical, and realistic. His last book was *Mogens og andre Noveller* (1882). The mixture of philosophy, science, and powerful imagination in his novels has made Jacobsen a favorite and influential writer. He created a new prose style for his native tongue. Consult: his *Letters*, edited by Georg Brandes (2d ed., Leipzig, 1899); Vilhelm Anderson, "Jens Peter Jacobsen," in his *Litteraturbilleder*, part ii (Copenhagen, 1907); Johannes Mayerhofer, "Jens Peter Jacobsen: sein Leben und seine Werke," in *Frankfurter Zeitgemässe Broschüren*, vol. xxxiii (Hamm, 1914).

JACOBSEN, Johan Adrian (1853–). A Norwegian traveler and ethnographical collector, born in Risö, near Tromsö. From 1867 to 1874 he sailed on a whaling ship along the Finmarken, Spitzbergen, and Murman coasts; in 1876–77 he visited Valparaiso and Patagonia; and for several years, while representative of Karl Hagenbeck of Hamburg, he traveled in the Arctic regions and returned with reindeer, families of Lapps and Eskimo, and various objects of interest. Between 1881 and 1888, for the Museum für Völkerkunde in Berlin, he traveled along the coast of America from Mexico to Bering Strait; through Siberia, Sakhalin, Korea, Japan, Borneo, Celebes, and Timor. In all he collected for the Berlin museum alone 18,000 ethnographical specimens. In 1889 he made collections in Germany, and in 1892 in Norway for the museum at Bergen. At the Chicago Exposition (1893) he exhibited collections from 25 non-European races. These became the foundation of the Field Columbian Museum in Chicago. His costly private collections he donated (1908) to the Ethnographical Museum in Christiania, Norway. He wrote *Reise an der nordwestküste Amerikas* (1884), *Eventyrlige farter* (1894), and *Reise in der inselwelt des Banda-Meeres* (1896).

JA′COB'S LADDER. 1. A ladder, reaching from earth to heaven, seen in a vision by Jacob (Gen. xxviii. 12). 2. On shipboard, a short rope ladder with iron or wooden rungs, to give easy access to the lower rigging, tops, etc. It is also the name of an apparatus for raising light weights a considerable height. One form, much used in breweries and distilleries, is an endless revolving chain of buckets, filling themselves at the bottom of the chain and emptying themselves at the top.

JA′COBSON, John Christian (1795–1870). A Danish-American Moravian bishop and educator, born in Burkall, Denmark. After completing his education at the German Moravian College, he came to the United States, at the age of 21, and occupied various positions till he became principal of the female seminary at Salem, N. C., in 1834. The academy grew and flourished under his control, but he left it to superintend a boys' boarding school in Nazareth, Pa., and to take the leadership of the Northern Moravian church, which made him a bishop in 1854. He retired three years before his death.

JACOB'S STAFF. 1. A kind of staff carried by pilgrims to the tomb of the Apostle James the Elder. The term is also applied to a dagger or sword concealed in a staff of this kind. 2. The three stars in a straight line in the Girdle of Orion. 3. Any stick used as a temporary mount for an instrument in preliminary surveys.

JACOB'S STONE, or JACOB'S PILLOW. The Stone of Scone, said to have served Jacob as a pillow when he had the vision of the ladder reaching into heaven. The stone is now preserved in the coronation chair (q.v.) of England.

JACOB'S WELL. The scene of the conversation of Jesus with the woman of Samaria. The well is near Nablus, in Syria, and is said to have been hewn in the rock by Jacob. A church built over the well is mentioned in the fourth century, but was destroyed during the period of the Crusades.

JACOB TOME INSTITUTE. An institution of secondary education at Port Deposit, Md., founded by Jacob Tome and opened in 1894. It comprises a kindergarten and junior school for boys and girls, a high school for girls, and a boarding school for boys, including two years of grammar school and four years of high school. It prepares for college, technical schools, professional schools, and business. Residents of Maryland are exempt from the annual tuition fee of $100. There are 20 buildings in a campus of over 160 acres. The library contains 10,000 volumes. The endowment exceeds $2,000,000, and the grounds and buildings of the institute have cost over $900,000.

JACO′BUS. A current but not official name for an English gold coin of the reign of James I (Lat. *Jacobus*), originally in 1603 valued at 20 shillings. The issue of a lighter sovereign of this denomination in 1604 increased the value of the Jacobus to 22 shillings, while in 1612 the value of the new coin was made 22 shillings, and the early coin rose to 24.

JACOBUS, Melancthon Williams (1816–76). An American Presbyterian minister and author, born at Newark, N. J. In 1834 he graduated from Princeton College and four years later from Princeton Seminary, where he was instructor in Hebrew for the year preceding his acceptance of the pastorate of the First Presbyterian Church in Brooklyn, N. Y. (1839). While absent in the Holy Land (1850–51), he was elected professor of Oriental and biblical literature in the Western Theological Seminary at Allegheny, Pa. This chair he held from 1852 until his death. He was pastor of the Central Presbyterian Church, Pittsburgh, Pa., from 1858 to 1870. In 1869 he was moderator of the last

General Assembly of the old-school branch of his church, and in 1870 presided, conjointly with Dr. Philemon H. Fowler, at the opening of the first Assembly of the reunited church He was secretary of the Sustentation Committee of the Presbyterian church from 1871 to 1874 and received the degrees of D.D. from Jefferson College, Pennsylvania (1852), and LL.D. from Princeton (1867). He published: *Notes on the New Testament* (4 vols., 1848–59); an *Address to the Churches* (1861); *Genesis* (2 vols., 1864–65); *Exodus* (shortly before his death).

JACOBUS, Melancthon Williams (1855–). An American theologian, born at Allegheny City, Pa., a son of the preceding. He graduated at Princeton in 1877, at Princeton Theological Seminary in 1881, from 1881 to 1884 studied at the universities of Göttingen and Berlin, and from 1884 to 1891 was pastor of the Presbyterian Church at Oxford, Pa. In 1891 he was appointed to the chair of New Testament exegesis and criticism in Hartford Theological Seminary (Congregational). He also served as acting president of the seminary in 1902–03 and as dean of the faculty after 1903. At Princeton Seminary he was Stone lecturer (1897–98) and at Mount Holyoke College lecturer on the New Testament (1901, 1903–04). In 1899–1900 he was acting pastor of the Centre Congregational Church at Hartford. The degree of D.D. was conferred on him by Lafayette College (1892) and Yale University (1910). His Stone lectures were published (1900) as *A Problem in New Testament Criticism.* He had charge of the New Testament department of the New International Encyclopædia, was chairman of the editorial board of the *Standard Bible Dictionary* (1909), edited an English translation of Zahn's *New Testament Introduction* (1909), and prepared a *Commentary on the Gospel of Mark,* for "The Bible for Home and School Series" (1914).

JACOBUS BAR'ADÆ'US. See Jacobites.

JACO'BUS DE BENEDIC'TIS. See Jacopone da Todi.

JACO'BUS DE VORAG'INE (c.1230–c.1298). An Italian writer, Archbishop of Geneva, and author of the celebrated Golden Legend (q.v.).

JACO'BY, Harold (1865–). An American astronomer, born in New York City. In 1885 he graduated at Columbia University, where he served as assistant, instructor, and adjunct professor from 1888 to 1904. He was appointed professor in 1904 and director of the observatory in 1906. In 1889–90 he was assistant astronomer on the United States eclipse expedition to West Africa in the United States steamship *Pensacola.* He became also a councilor of the New York Academy of Sciences, treasurer of the American Mathematical Society, editor of the *Transactions* of that society, and fellow of the Royal Astronomical Society of London. His technical papers on astronomical photography, star clusters, parallaxes, and other subjects appeared in the publications of the New York Academy of Sciences, the Academy of St. Petersburg, the Académie des Sciences of Paris, the Academy of Helsingfors, and the Royal Astronomical Society of London. He published *Practical Talks by an Astronomer* (1902), a collection of interesting essays, written in untechnical style, on "Navigation at Sea," "Galileo," "Photography in Astronomy," "The Moon Hoax," and other special topics. The department of astronomy in the first edition of the New International Encyclopædia was edited by him. He is also author of *Astronomy: A Popular Handbook* (1913).

JACOBY, yä-kō'bē, Johann (1805–77). A German politician, born in Königsberg, Prussia, of Jewish parents. He studied at Königsberg and Heidelberg, became a practicing physician at Königsberg in 1830, and wrote numerous pamphlets on questions of the time. His *Vier Fragen* (1841), in justification of the demand for a Prussian constitution, brought upon him accusation of high treason and a sentence to two and a half years' imprisonment, but in 1843 he was released and almost immediately came into conflict with the censor again. In 1848 he was elected to the Vorparlament of Frankfort as a reform member, and to the National Assembly of Prussia, where by his incisive speeches he identified himself with the Left. He was elected to the German National Assembly in 1849, took part in the Rump Parliament, and again was accused of high treason against the King personally. In 1863 he became a member of the Prussian Lower House, and both there and in the *Zukunft* journal, established by him, was an increasingly violent opponent of the government. He even styled German unity the death of freedom. In 1864 and again in 1870 he was sentenced to imprisonment. He retired from political life in 1871. His publications include a biography of Heinrich Simon (1865) and his *Gesammelte Schriften und Reden* (1872; an additional volume, 1877). *Der Geist der griechischen Geschichte* was published under the editorial supervision of F. Röhl in 1884.

JACOPO DA PONTE, yä'kō-pō dä pōn'tā. An Italian painter commonly known by the title Jacopo Bassano. See Bassano.

JACOPO DEI BARBARI, dā'ē bär'bä-rē (c.1440–50–c.1515). An Italian painter and engraver, called also the 'Master of the Caduceus' from the sign on his plates, and by contemporary Germans Jacob Walch. He was one of a family of painters and was brought up and worked in Venice, where he was probably a pupil of Bartolommeo Vivarini. About 1490 he went to Nuremberg and remained there for several years, exercising a strong influence upon Dürer and Hans von Kulmbach. By 1500 he was back in Venice, for at this time he executed a large bird's-eye view of the city, engraved on wood. From 1505 to 1510 he was active in various cities of Germany, as court painter to Emperor Maximilian, then in the service of Count Philip of Burgundy, and finally (1510) he became valet de chambre and court painter to the Regent Margaret of the Netherlands. He is mentioned as dead in 1516. There has been much discussion about the life and works of this artist. He was one of the first to engrave on metal and left 30 plates, of which some are of mythological and some of religious subjects. His paintings are of less importance, and he is also said to have been a sculptor. The interest of Barbari is largely on account of the curious union in him of the German and Venetian styles of art, most uncommon at that date. Consult the monographs by Galichon (Paris, 1861) and Ephrussi (ib., 1876). Reproductions of all his engravings and woodcuts are given in the admirable folio edited by Kristeller for the International Chalcographical Society (Berlin, 1896).

JACOPO DELLA QUERCIA. See Quercia, Jacopo della.

JACOPONE DA TODI, yä′kō-pō′nȧ dȧ tō′dē, Jacobus de Benedictis (c.1230–1306). An Italian mystic and poet. He was born at Todi in Umbria, was a lawyer and successful in his profession. The sudden death of his wife, about 1268, wrought a complete change in his life. He abandoned his profession, distributed his goods among the poor, and sought the world's scorn by his strange behavior. At the same time he vigorously denounced the corruptions of the times and the ambitions of the lofty. After 10 years of penance he became a Franciscan monk, expressing his humility by remaining a lay brother. He joined the opponents of Boniface VIII, was captured at Palestrina in 1298, and kept in prison till the Pope's death in 1303. He died at Collazzone on Christmas night, 1306. Jacopone's poetry was most of it written in the Umbrian dialect. His hymns are characteristic of his time, full of the fervor and the same exalted enthusiasm which are to be found in those of St. Francis of Assisi. The hymn "Stabat Mater Dolorosa" is generally attributed to Jacopone, perhaps incorrectly. Consult: Sorio, *Poesie scelte di Fra Jacopone da Todi* (Verona, 1859); D'Ancona, "Jacopone da Todi, il giullare di Dio del secolo XIII," in *Studi sulla letteratura italiana de' primi secoli* (Ancona, 1884); Gebhart, *L'Italie mystique* (Paris, 1890); Macdonnell, *Sons of Francis* (London, 1902); Bruguali, *Fra Jacopone da Todi* (Assisi, 1907). He is the hero of a novel by Dorsey, *The Mad Penitent of Todi* (Notre Dame, Ind., n. d.).

JACOTOT, zhȧ′kō′tō′, Jean Joseph (1770–1841). The originator of a 'universal' method in education, born at Dijon, France, in 1770. He turned his attention at first to philology and, after having studied that subject for some time, became a teacher of the classic languages in his native town. Subsequently he took up the study of law and became an attorney. In 1792 he entered the army and rose to the rank of captain of artillery; he was then made secretary to the Minister of War, and finally a substitute director and professor of mathematics at the Polytechnic School in Paris. In 1815 he went to Brussels and three years later accepted the position of professor of French language and literature at the University of Louvain. In 1827 he became a director of the advanced military school in that city. He returned to France in 1830 and died in Paris.

His system of universal instruction was empirical, propounded in general rules which are unintelligible without his own explanation. It consists in directing the student's exertion to particular subjects, encouraging and exciting him in every possible manner to make use of his mental powers. The teacher is not to become an expounder, but, after setting the student on the right track, is to leave him to explain away his own difficulties. His ideas were an outgrowth of his own intellectual development and of his experience at Louvain, where he, though French and understanding no Flemish, taught the Flemish boys by books having French and Flemish in parallel columns, largely through one book, the *Télémaque*. There he saw that the pupils learned, though he did not teach them. This plan was applied to other subjects, with the idea that one could teach all subjects, even those of which he might have no knowledge himself. There were four steps insisted upon in the process of learning: first, learn; second, repeat; third, reflect; fourth, verify. His famous maxims, "Pupils must learn something and refer to that all the rest" and "All is in all," meant that all things in nature are united in one great whole, the knowledge of which may be acquired through any of its parts. His ideas are empirical approaches to the ideas of concentration, interest, etc., of Herbart, though expressed in exaggerated or paradoxical form. His method of language teaching is quite similar to the popular plans of Hamilton and of Ollendorf.

Jacotot expounded his ideas in *Enseignement universel* (1822) and in the *Journal de l'Emancipation Intellectuelle*. Others of his works are *Musique, dessin et peinture* (1824) and *Mathématiques* (1828). For his life and works, consult his English disciple Payne, *Lectures on the History of Education* (London, 1892), and Quick, *Educational Reformers* (New York, 1907).

JACQUARD, zhȧ′kär′, Joseph Marie (1752–1834). A French inventor, born at Lyons. He was the son of a weaver and at first followed his father's trade, but afterward was a bookbinder and typesetter. Still later, after the death of his father, he began experimenting with looms and lost his small inheritance (1772). In 1793 he fought in the Army of the Rhine, on the Rhone and Loire, and then went back to Lyons, where he completed his invention, known as the Jacquard loom, for which he was awarded a bronze medal at the Industrial Exposition of 1801. He continued to improve his loom despite the hostility of the Lyons silk weavers, who feared that his labor-saving device would throw them out of employment. In 1806 his invention was bought by the state and declared public property. Jacquard was rewarded with a pension and a royalty on each loom, and in 1840 a statue of him was erected at Lyons. See Loom, for an account of his invention.

JACQUE, zhȧk, Charles Emile (1813–94). A French animal and landscape painter and etcher, one of the most eminent of the nineteenth century. He was born in Paris, was apprenticed to an engraver at 17, then worked in Antwerp and for two years in London, where he designed wood engravings, illustrating Shakespeare and a *History of Greece*. Returning to France, he joined the Barbizon group and became known as its great sheep painter, just as Troyon was its painter of cattle. Another favorite subject was poultry yards, on which he himself wrote a book entitled *Le poulailler* (1869). In 1867 he was decorated with the cross of the Legion of Honor and in 1889 received the Grand Prix for etching and a gold medal at the universal exposition of the same year for his paintings. His canvases, small in size, are big in conception, conscientious and virile in execution, and show mastery of landscape, especially the sky. But he is even more important as an etcher, by reason of his powerful influence upon the development of the art in France. His technique is well-nigh faultless in its delicate yet vigorous line, its mastery of chiaroscuro, and its harmonious tonal effects. In this medium the scope of his art was wider, including admirable landscapes and peasant subjects. Under the influence of Millet, whose most intimate friend he was, his art, which at first inclined to prettiness, became increasingly virile. His painting is represented in the Louvre by an imposing "Flock of Sheep" in the midst of a firm landscape and by three other examples;

in many French provincial collections; and in the Metropolitan Museum, New York, by four sheep subjects, including one in the Vanderbilt collection.

JACQUELINE, zhȧk'lēn'. The name given to grotesque mugs, in the shape of a woman seated, first made in Desvres, France, and later in Holland, Germany, and England.

JACQUEMART, zhȧk'mär', Henri Alfred Marie (1824–95). A French sculptor, born in Paris. He studied painting there under Paul Delaroche, but forsook it for sculpture, which he studied with Klagmann. He exhibited animal groups at the Salon from 1847 to 1879. His most important works are the equestrian bas-relief of Louis XII at Compiègne, the bronze statue of Mehemet Ali in Alexandria, the four colossal lions upon the bridge in Cairo, two griffins at the Fountain of Saint-Michel, Paris, and the statue of Mariette Bey at Boulogne-sur-Mer. He received the decoration of the Legion of Honor (1870).

JACQUEMART, Jules Ferdinand (1837–80). A French etcher, born in Paris. While he painted at least 110 water colors, of which three—"Japanese Art Objects," "Landscape near Nice," and "Flowers"—are in the Metropolitan Museum, New York, his reputation depends upon his etchings, the best of which were published in the *Gazette des Beaux-Arts*. The same magazine also reproduced many of his wood engravings and pen drawings. He was, first of all, an illustrative artist, etching 27 plates for the *Histoire de la porcelaine* (Paris, 1862) by his father, Albert Jacquemart; 12 plates for his father's *Histoire de la céramique* (ib., 1873); the series of 47 plates published by Techener (ib., 1864) under the title *Histoire de la bibliophile;* 60 for Barbet de Jouy's *Les gemmes et joyaux de la couronne* (ib., 1868); 88 for Loubat's *Medallic History of the United States of America* (New York, 1878), reproducing many medal portraits of famous Americans, among them George Washington, Horatio Gates, Anthony Wayne, Benjamin Franklin, John Paul Jones. Among the many famous paintings etched by Jacquemart were 12 owned by the Metropolitan Museum (London, 1871). He was one of the founders of the Société des Aquarellistes (Water Color Society), and almost from the moment he made his début in 1859 enjoyed an immense reputation. His etchings rank high as finished works of art, but lack boldness and strength. For a descriptive list of 395 of his etchings, with biographical and critical notes and many illustrations, consult Louis Gonse, "Jules Jacquemart," in *Gazette des Beaux-Arts* (Paris, 1875, 1876, 1880, 1881).

JACQUEMEL. See Jacmel.

JACQUEMINOT, zhȧk'mē'nō', Jean François, Viscount (1787–1865). A French general. He was born at Nancy, studied at the Ecole Militaire, entered the army in 1803 and, rising to the grade of colonel, distinguished himself at Austerlitz, Essling, Wagram, and the Beresina. When Napoleon returned from Elba, Jacqueminot was made commander of lancers. He made a brilliant charge at Quatre Bras and after Waterloo refused transfer to the service of the Bourbons, was imprisoned for a month, and after his release established at Bar-le-Duc a great silk factory, which gave employment to many of the veterans of the Republic. Elected to the House of Deputies in 1827, he joined in the protest of the Two Hundred and Twenty-one against Polignac, and with Pajol directed the Rambouillet expedition which led Charles X to leave France. In 1842 he succeeded Chaud as commander of the National Guards of the Seine. Louis Philippe made him Viscount in 1846. His indecision at the head of the Guards made possible the revolution of 1848, and he was retired in that year.

JACQUEMONT, zhȧk'mōN', Victor (1801–32). A French traveler and botanist, born in Paris. He traveled in the West Indies in 1826 and two years later was appointed by the authorities of the Royal Gardens to undertake a voyage of exploration in India. After several delays caused by an insufficient outfit, he crossed the Himalayas, explored a portion of Tibet, and reached Chinese Tartary. He brought back many specimens of new plants. Shortly after his return he died in Bombay. Guizot edited his scholarly and entertaining *Voyage dans l'Inde* (1836–44), which contains much information on a variety of subjects. His *Correspondance* (1833) is particularly interesting from his gift for observation and the easy, familiar style in which he wrote.

JACQUERIE, zhȧ'krē' (from *Jacques Bonhomme*, the common epithet bestowed by the nobles in derision on the French peasant). The name given to the insurgent peasants in France in the middle of the fourteenth century, in the reign of John the Good. The insurrection of the Jacquerie broke out in the year 1358, when the French King was a prisoner in England and France in a state of the greatest disorder and anarchy as a result of the invasions by the armies of Edward III. The immediate occasion of it was a collision between adherents of some nobles and the peasants in the month of May in the neighborhood of Beauvais; but it was really caused by long-continued oppression on the part of the nobles. Suddenly rising against their lords, the peasants laid many castles in ruins, murdered some nobles, and pillaged the country—acting, as they said, on the principle of doing as had been done to them. For some days the region of the lower Marne and the Oise was entirely at their mercy, and the peasants were joined by the bourgeoisie in some of the towns; but the magnitude of the danger induced the quarrelsome nobles to make common cause against them, and on June 10 the peasants were defeated with great slaughter near Meaux by Charles the Bad of Navarre. This put an end to the insurrection. But the nobles took a terrible revenge, burning the villages and killing the peasants. In two weeks 20,000 are said to have been murdered. Froissart, who had no sympathy for the peasants, undoubtedly drew too dark a picture of the atrocities committed by the Jacquerie, while minimizing the sanguinary vengeance exacted by the nobles. Consult Flammermont, in the *Revue Historique*, vol. ix (Paris, 1879), and Luce, *Histoire de la Jacquerie* (ib., 1895).

JACQUES DE CUJAS. See Cujacius.

JACQUES OF VITRY. See Jacob of Vitry.

JACQUIN, zhȧ'kăN', Nikolaus Joseph, Baron (1727–1817). An Austrian botanist, born at Leyden. He studied medicine in his native city and in Paris and afterward went to Vienna, where he made a catalogue of the plants in the garden at Schönbrunn for Emperor Francis I. From 1755 to 1759 he traveled in South America. Some years after his return he became professor of botany and chemistry at the University of Vienna. He was ennobled in 1774. Some of the more important of his works are: *Hortus Botanicus Vindobonensis* (1770–76); *Flora Austriaca* (1773–78); *Icones Plantarum Rariorum* (1781–93); *Plantarum Rariorum Horti Cæsarei Schönbrunnensis* (1797–1804).—His son, Franz Joseph (1767–1839), was also a botanist.

JAC'TITA'TION (ML. *jactitatio*, from Lat. *jactitare*, to utter, frequentative of *jactare*, to agitate, discuss, frequentative of *jacere*, to throw; connected with Gk. *ἰάπτειν*, *iaptein*, to throw). The legal offense of falsely and maliciously asserting a legal claim or right to the detriment of another. The offense is not generally dealt with by the law as a crime, nor does it come within the class of wrongs, denominated torts, which are remediable by an action for damages, but it may by appropriate process be suppressed, and the rights of the injured party established by a decree. In English law the offense is cognizable only by the ecclesiastical courts and by the Probate, Divorce, and Admiralty Division of the High Court of Justice, and is confined to the false assertion of a right to tithes and to a seat in a church and to the false claim of marriage to another. In the last-named case the process is called *jactitation of marriage*. The action is of rare occurrence in England, but is more common in Scotland. It has never existed in the United States. Consult Sir William Blackstone, *Commentaries on the Laws of England* (4th ed., 2 vols., Chicago, 1899).

JACUARU, jȧ-kōō'ȧ-rōō. A Brazilian lizard. See Teju.

JADASSOHN, yä'dȧ-sōn, Salomon (1831–1902). A German musical composer and theorist, born at Breslau. He studied the pianoforte under Hesse and Liszt, the violin under Lüstner, and in 1848 entered the conservatory at Leipzig, in which institution he subsequently (1871) became professor of harmony, pianoforte composition, and counterpoint. He studied under Liszt in 1849, but his career as a teacher dates from 1852, after a course of private study under Hauptmann. His various works on the science of music have continued to be used as textbooks throughout the world. He is the composer of about 150 works in nearly every musical form, all written in faultless style. Although he will be remembered as a great theorist rather than as a great composer, many of his compositions bear evidences of permanent value. He was appointed conductor of the Psalterion Choral Society in 1866, and from 1867 to 1869 was kapellmeister of the Euterpe organization. Among his textbooks the following are noteworthy: *Harmonielehre* (Leipzig, 1883; Eng. trans., New York, 1893); *Kontrapunkt* (Leipzig, 1884); *Kanon und Fuge* (ib., 1884); *Lehrbuch der Instrumentation* (ib., 1889) (the above have also been translated into English at Leipzig); *Elementar-Harmonielehre* (ib., 1895).

JADE (Fr., Sp. *jade*, from Sp. *yjada*, *ijada*, side, from Lat. *ilium*, flank, groin; ultimately connected with Gk. *εἴλειν*, *eilein*, Lat. *volvere*). A name applied to various tough, compact minerals of the pyroxene and amphibole groups, chiefly jadeite and nephrite, of a white to dark-green color. These minerals were used by primitive man for utensils and ornaments, and among the Chinese they are highly prized as material for vases and other carved objects, which now are frequently seen in museums and art collections in Europe and America. Specimens of jade have been found among the remains of the lake dwellers of Switzerland, at various points in France, and in Mexico, Greece, Egypt, and Asia Minor. The chalchihuitl (q.v.) of the early Mexicans has been supposed by some to have been jade, but the present belief is that this name refers to the turquoise found in the mines in New Mexico. Consult H. R. Bishop, *The Bishop Collection, Investigations, and Studies in Jade* (2 vols., New York, 1906).

JADE, yä'de, or **JAHDE**. An inlet of the North Sea in the Grand Duchy of Oldenburg (Map: Germany, C 2). It owes its origin to coastal sinking combined with storm floods between 1218–1511. It is about 10 miles in diameter, and the greater part is shallow, with exposed mud flats at low tide; but at the narrow inlet it is deep enough for the largest men-of-war, and here a small territory a little over a mile in extent was acquired by the Prussian government from Oldenburg in 1854. On it was built the fortified port and naval station of Wilhelmshaven (q.v.).

JADLOWKER, yȧt-lōf'kẽr, Herman (1879–). A Russian tenor, born in Riga. In order to escape from a commercial career into which his father wished to force him, he ran away from home as a lad of 15 and finally went to Vienna, where he studied singing with Gänsbacher. In 1899 he made his début at Cologne in Kreutzer's *Nachtlager von Granada*. He then secured engagements in Stettin and Karlsruhe. Here Emperor William heard him and was so impressed that he offered him a five-year contract at the Royal Opera in Berlin. From there he went to Vienna. In 1910 he appeared at the Metropolitan Opera House, where he was one of the most versatile and reliable artists. In 1912 he returned to Berlin.

JADWIGA, yät'vē-gȧ. See Hedwig.

JAD'WIN, Edgar (1865– ,). An American military engineer, born at Honesdale, Wayne Co., Pa. He studied at Lafayette College in 1884–86 and graduated from the United States Military Academy at the head of his class in 1890. He was in local charge of the enlargement of Ellis Island, New York harbor (1890–91); was on duty with engineer troops and at the United States Engineer School (1891–95); and between 1893 and 1902, except during the Spanish-American War, was an assistant on government engineering works in connection with rivers, harbors, and fortifications. In the Spanish-American War he served as major and later as lieutenant colonel, Third Regiment U. S. V. Engineers, and was in command of the detached Third Battalion of the regiment at Matanzas, Cuba. From 1902 to 1907 Colonel Jadwin was in charge of river, harbor, and fortification work, first on the Pacific coast south of San Francisco and later on the Texas Gulf coast, having charge of the construction of the sea wall at Galveston. From 1907 to 1911 he worked on the Panama Canal, at first in the Chagres division; later he was in charge of breakwater construction at Colon, of the excavation of the sea-level canal from the Atlantic Ocean to Gatun, and of the rock and sand supply for the Gatun locks and spillway. He was promoted to a lieutenant-colonelcy in 1913. He contributed articles on military engineering to the first and second editions of the New International Encyclopædia.

JAEGER. See Jäger.

JAEGER, or **JÄGER, GULL.** See Skua.

JAEGERS, jā′gẽrz, Albert (1868-). An American sculptor. He was born in Elberfeld, Germany, came to America as a boy, and was self-taught in his art. He was represented at the Buffalo and St. Louis expositions and modeled statues for the new customhouse, New York, and the Fine Arts Building, St. Louis. He also executed a number of cleverly composed reliefs and fine portrait busts and won frequent competitions, including that for the Baron von Steuben Monument in Washington. A replica of the latter was presented by Congress to the German Emperor, who thereupon decorated Jaegers. He became a member of the National Sculpture Society.

JAÉN, hȧ-ān′. A former kingdom in Andalusia, south Spain, now the Province of Jaén, which includes a somewhat larger area (5205 square miles) than the old kingdom (Map: Spain, D 4). It is bounded by New Castile on the north, Murcia on the east, Granada on the south, and Cordova on the west. It lies in the upper basin of the Guadalquivir. The northern part is traversed by the Sierra Morena, now deforested and almost barren, while in the south and east are the rugged, lofty, and well-forested Sierras de Segura and Cazorla. The mineral wealth, especially of the northern mountains, is considerable, including lead, iron, copper, zinc, and salt. Though iron ore is plentiful, argentiferous lead is the only metal extensively mined, the production amounting to over 80,000 tons of ore annually. Agriculture is confined to the valley of the Guadalquivir; cereals and olives are grown; other industries are unimportant. The population of the province in 1900 was 474,490 and in 1910, 526,718. The largest city is Linares, and the capital is Jaén.

The Moorish Kingdom of Jaén arose in the eleventh century at the time of the dissolution of the Caliphate of Cordova. It was short-lived and of little importance. The region was conquered by Castile early in the fourteenth century.

JAÉN. The capital of the province of the same name, Spain, situated in the valley of the Guadalquivir, at the foot of Mount Jabalcuz, 58 miles east of Cordova and on a branch of the railroad between Madrid, Cordova, and Seville (Map: Spain, D 4). It is surrounded by the remains of old Moorish walls, with numerous towers and pinnacles. There are several old Gothic churches, a cathedral, and a few interesting remains of its heyday as a Moorish capital; the only really handsome buildings of the town, however, are among its private palaces, e.g., those of the counts of El Villar del Prado and of the Suárez family. The town has a high school or institute containing extensive art galleries and a fine library; it has also a theatre and a bull ring. In the neighborhood are the sulphur springs and baths of Jabalcuz. Pop., 1900, 25,566; 1910, 26,894.

JAFFA, yăf′fȧ (Ar. *Yafa*). A seaport town of Syria, Asiatic Turkey, situated in the Sanjak of Jerusalem, on a rocky coast, 35 miles northwest of Jerusalem, of which it is the port and with which it is connected by a railway line 54 miles long (Map: Palestine, B 3). It is irregularly built and possesses few points of interest. Its mosques and monasteries are of slight architectural merit, and its harbor is far from safe. The coast is skirted by a dangerous reef, through which the entrance is exceedingly narrow. In stormy weather it is often impossible to land for days at a time. As the port of Jerusalem, however, Jaffa is not without commercial value, and its importance is increasing with the development of the surrounding region. The chief exports of Jaffa are soap, fruits, wine, oil, and sesame, while the imports consist chiefly of cotton goods, rice, sugar, petroleum, tobacco, lumber, etc. The oranges of Jaffa are justly reputed the finest in the world. Jaffa is the seat of many consular agencies, including one from the United States. In the city is a German colony founded by the Friends of the Temple (q.v.); another templar colony is at Sarona, about 1 mile northeast of the city. In the vicinity of Jaffa is a Jewish colony of the Alliance Israélite, with a school of agriculture. There are several missionary hospitals and schools. The population is estimated at over 45,000, mostly Mohammedans, but it includes a colony of some 8000 Jews. See Joppa.

JAFFÉ, yăf′fȧ, Philipp (1819–70). A German historian, born at Schwersenz in Posen and educated at Berlin under Ranke. He became an active editor of the *Monumenta Germaniæ Historica* and published *Geschichte des deutschen Reichs unter Konrad III.* (1845) and the very valuable *Regesta Pontificum Romanorum* (2d ed., 1881–86). Dissatisfied with his academic advancement, he took up the study of medicine. After passing his examination in medicine, he returned to his former scientific studies. His excellent contributions to the *Monumenta* were broken off in 1863, a year after his appointment to a chair in Berlin, by a quarrel with Pertz. He became a Christian in 1868, lost many of his earlier friends, and committed suicide at Wittenberg. His most important work was the *Bibliotheca Rerum Germanicarum* (1864–73).

JAFFNA, jăf′nȧ, or **JAFFNAPATAM**, jăf′nȧ-pȧ-tăm′. A fortified town situated on an island of the same name, lying off the northern coast of Ceylon, of which it is an administrative dependency, and from which it is separated by a narrow strait (Map: India, D 8). It has an old fort erected during the Portuguese occupation, a few interesting temples, and an old Dutch church. The natives engage in considerable trade in tobacco and Palmyra timber. Jaffna is identified with the Galiba of Ptolemy. Pop. (largely native), 1900, 33,860; 1911, 40,539.

JAFFRAY, jăf′rȧ, Robert (1832–1914). A Canadian legislator and capitalist. He was born near Bannockburn, Scotland, early engaged in business in Edinburgh, and went to Toronto, Ontario, in 1852. For 31 years he was in the grocery trade and afterward in a large number of financial, railway, insurance, and industrial undertakings, becoming president of, or director in, many corporations, including the Globe Printing Company. He was a Liberal in politics and in 1906 was appointed a member of the Dominion Senate. While not prominent in politics in the common acceptation of the term, he was the trusted adviser of Liberal leaders and by personal integrity and farsighted views exerted a strong influence upon their policy and legislation.

JAGANNATH, jŭg′ȧ-năt, **PURI**, po͞o′rē, or Juggernaut (Skt. *Jagannātha*, lord of the world, from *jagat*, world, going, pres. p. of *gam*, to go + *nātha*, lord, from *nāth*, to seek help). 1. The name of a town on the coast of Orissa, Bengal, in lat. 19° 48′ N., long. 85° 50′ E., Puri being now the official name (Map: India, F 5). It is celebrated as one of the chief places of pilgrimage in India. For many centuries the Golden Tooth of the Buddha was preserved at Puri, but it owes its reputation now to a temple erected there in honor of Vishnu, under his aspect as Jagannath. 2. The deity of Jagannath is essentially a god of all people, and this fact, combined with the peculiarly attractive nature of Krishna, also an incarnation of Vishnu, is the chief cause for the reverence paid him. It seems probable that the "lord of the world" was originally a local godling of non-Indian origin, who was absorbed into the Vishnuitic form of Hinduism, which holds sway especially in eastern India. Jagannath has a magnificent temple in Puri and is exposed to view three days each year. On the first of these days (the *Suan jattra*, or bathing procession) the god is publicly bathed. Ten days later, on the *Rath jattra*, or car festival, he is drawn on an enormous and floridly ornate car to some neighboring temple, whence he returns in somewhat diminished pomp after a week. The fact that in the press and excitement of the enthusiastic multitude fatalities occasionally occur has given rise to the erroneous popular idea that devotees seek to be crushed to death beneath the car. Consult: Sir William Hunter, *Orissa* (London, 1872); Wilkins, *Modern Hinduism* (ib., 1887); *The Imperial Gazetteer of India*, under "Puri," vol. xx (Oxford, 1908); James Fergusson, *History of Indian and Eastern Architecture* (2 vols., London, 1910).

JAGELLONS, yȧ-gĕl′lonz. The name of an illustrious dynasty which reigned in Lithuania, Poland, Hungary, and Bohemia. This name is derived from Jagello or Jagellon, the last of a long line of hereditary grand dukes of Lithuania, who succeeded to his patrimonial possessions in 1381. Jagello in 1386 married Hedvig, daughter of Louis the Great, King of Poland and Hungary, who had succeeded her father on the Polish throne, and he was recognized as King by the Poles. He embraced Christianity and is known as Ladislas (Wladislaw) II of Poland. He died in 1434.—His son, Ladislas III (q.v.), King of Poland (1434–44), was also elected King of Hungary after the death of Albert of Austria, in 1440, mainly through the agency of John Hunyady. He was succeeded in Poland by his brother, Casimir (1444–92), whose three sons, John Albert (1492–1501), Alexander (1501–06), and Sigismund I (1506–48), reigned in succession.—Sigismund II Augustus (1548–72), the son of this last and one of the wisest of the Polish monarchs, added Livonia to his kingdom. With him the male line of the Jagellons ended, but through his sisters descendants of the Jagellons ruled from 1587 to 1668.—Ladislas, the son of Casimir IV of Poland, was elected King of Bohemia in 1471, on the death of George Podiebrad, and also succeeded Matthias Corvinus in Hungary in 1490. Ladislas died in 1516 and was succeeded in both kingdoms by his son, Louis II, who was defeated and slain by the Turks at Mohacs (Aug. 29, 1526), and with whom terminated the male line of the Jagellons of Bohemia and Hungary. His sister Anna married Ferdinand I. See Poland. Consult Roepell and Caro, *Geschichte Polens* (Hamburg, 1840), and Andrássy, *Development of Hungarian Constitutional Liberty* (Eng. trans., London, 1908).

JAGEMANN, yä′ge-män, Christian Joseph (1735–1804). A German scholar, born at Dingelstedt. After two years in Denmark, he spent several years in Italy, where he studied Italian literature. In 1774 the Elector of Mainz made him director of the Catholic Gymnasium of Erfurt, and afterward he was appointed private librarian of the Duchess Anna Amalie at Weimar, where he became a Protestant and married. His principal works were *Geschichte der freien Künste und Wissenschaften in Italien*, a revision of Tiraboschi's *Storia della letteratura italiana* (1777–81), and *Magazin der italienischen Litteratur und Künste* (1780–85), in which his translation of Dante's *Inferno*, in unrhymed iambic pentameter, appeared. His four-volume Italian-German and German-Italian dictionary appeared in 1790–91.

JÄGER, yā′gẽr, Gustav (1832–). A German naturalist and hygienist, born at Bürg in Württemberg. He studied at the Theological Seminary of Urach, at the Stuttgart Polytechnic, and at the Tübingen Hochschule. For about 10 years he was a teacher of zoölogy in Vienna. From that time until 1884, when he began to practice medicine, he was a director of zoölogical gardens or a teacher in various German schools. He wrote a number of books on natural science, but his fame rests chiefly on his advocacy of the use of none but wool clothing. His publications include: *Die Darwinische Theorie und ihre Stellung zu Moral und Religion* (1869); *Lehrbuch der allgemeinen Zoologie* (vol. i, 1871; vol. ii, 1878); *Die Normalkleidung als Gesundheitsschutz* (1880; 4th ed. as *Mein System*, 1885); *Die Uniform im Licht der Gesundheitslehre* (1887); *Ein verkannter Wohltäter* (1891); *Selbstarznei im Heilmagnetismus* (1908); *Leben im Wasser* (3d ed., 1908).

JÄGER, Oskar (1830–1910). A German historian and educator, son of the scientist Georg Friedrich Jäger, born at Stuttgart and educated at Tübingen. He taught in the Gymnasia of Stuttgart, Ulm, and Wetzlar, and was rector and director at Mörs and Cologne. After being pensioned in 1901 he was made honorary professor of pedagogy at Bonn. His pedagogical works are: *Aus der Praxis, ein pädagogisches Testament* (1885–97); *Das humanistische Gymnasium* (1890); *Didaktik und Methodik des Geschichtsunterrichts* (1895; 2d ed., 1904). His more important historical works are: *John Wycliffe* (1854); *Geschichte der Römer* (6th ed., 1901); *Geschichte der Griechen* (6th ed., 1900); *Die punischen Kriege* (1869–70); *Weltgeschichte* (last ed., 1899); new editions of Schlosser, *Weltgeschichte für das deutsche Volk* (5th ed., 1904); *Auswahl wichtiger Aktenstücke zur Geschichte des 19. Jahrhunderts* (1893), with Moldenhauer.

JÄGERNDORF, yā′gẽrn-dôrf. A frontier city in the Austrian Crownland of Silesia, on the Oppa, 14 miles by rail northwest of Troppau (Map: Austria, E 1). It is finely situated, 1018 feet above the sea, has a castle built by the Prince Liechtenstein and a beautiful church. There are also several technical schools. The town is a centre of the woolen industry and has manufactures of paper, organs, machines, cordials, woolen and woven goods, and vinegar. It is an important market for the surrounding country. Pop., 1900, 14,675; 1910, 16,681, chiefly of German descent. Jägerndorf was plundered by the Tatars in 1241. In 1745 it was the scene of two battles between the Prussians and the Austrians.

The town was the capital of the Principality of Jägerndorf, which was bought in 1523 by the house of Hohenzollern, but in 1623 it was given by the Emperor to Prince Charles of Liechtenstein, because its Prince, John George of Hohenzollern, had supported Frederick of Bohemia in his fight against the Emperor. The house of Hohenzollern, however, did not resign its claims, and by the Peace of Breslau (1742) Frederick the Great obtained from Austria the cession of a small portion of the principality, which now forms Prussian Jägerndorf.

JAG′GAR, Thomas Augustus (1839–1912). An American Protestant Episcopal bishop. He was born in New York City, graduated at the General Theological Seminary, New York, and was ordained priest in 1863. He was rector of Anthon Memorial Church, New York (1864–68); of St. John's, Yonkers (1868–70), while there founding St. John's Riverside Hospital; and of Holy Trinity, Philadelphia (1870–75). For 30 years (1875–1905) he was Bishop of southern Ohio. After he had retired from charge of this diocese he still retained his seat and vote in the House of Bishops, and from 1908 until his death he was Bishop in charge of American churches in Europe. He published *The Personality of Truth*, Bohlen lectures for 1900, besides various essays, sermons, and addresses.

JAG′GERY (Anglo-Ind., from Hind. *shakkar*, from Prak. *sakkara*, from Skt. *śarkara*, sugar). The name given in the East Indies to the sugar obtained from palm sap. In the Philippines it is called pakaskas. In obtaining the sap the flower spathe is cut in the case of the coconut and nipa, or with the buri the head of the palm is tapped. The juices of the palms contain about 15 per cent of sugar. The sugar is generally consumed in the countries where it is produced and is very impure. Chemically much of it is identical with cane or beet sugar, but its production on a commercial scale has never succeeded. More recent experiments tend to show, however, that with modern sugar-making machinery the nipa palm may yield considerable amounts of a comparatively pure sugar. See Caryota.

JAGIĆ, yä′gich, Vatroslav (1838–). A Slavic philologist, born at Warasdin and educated at Vienna. In 1860 he was appointed a teacher at Agram, and in 1870 he was elected member of the South Slavic Academy. But in the same year he was dismissed from Agram and became professor of comparative philology at Odessa. He resigned this position in 1874 to take the new chair of Slavic philology at Berlin, where he founded (1875) the *Archiv für slawische Philologie*. In 1880 he succeeded Sresnevski at St. Petersburg, and six years afterward became professor of Slavonic philology at Vienna. He retired in 1908. Jagić was chosen member of the Royal Servian Academy of Belgrade, of the Imperial Academy of Cracow, and of the Imperial Academy of St. Petersburg. His works, besides contributions to *Književnik*, *Rad*, *Starine*, the *Proceedings of the Vienna Academy*, and his *Archiv*, bear chiefly on the early history of the Slavs, on their languages and literatures; they are too numerous to mention, but a complete bibliography will be found in the *Festschrift* (*Sbornik*), written by his former pupils in 1908. Jagić is the editor of the *Slavic Philological Encyclopedia* (*Entziklopediia Slavionskoi Filologii*), published at St. Petersburg (1909 et seq.), to which he contributed a *History of Slavic Philology* (ib., 1910).

JAGO, jā′gō, Richard (1715–81). An English poet, born at Braudesert, who, after taking his B.A. and M.A. degrees at Oxford, became curate (1737) and then rector (1754) of Snitterfield, Warwickshire, where, although he received other and richer preferments, he mainly resided and where he died. Shenstone, his friend from university days, admired his poetry, especially his elegy "The Blackbirds." His poems, which had made their appearance in various ways and places, were finally posthumously published, as revised by the author, under the title *Poems Moral and Descriptive* (1784). Aside from his poetry, Jago's work is quite insignificant. Consult the notice of Jago prefixed to the 1784 edition of his poems, mentioned above, and F. L. Colvile, *Warwickshire Worthies* (London, 1870). Some of his poems will be found in A. Chalmers's *English Poems*, vol. xvii (ib., 1810).

JAGOW, yä′gō, Gottlieb von (1863–). A German statesman, born in Berlin, son of the hereditary master of the hunt. He was educated at Bonn. In 1886–95 he held different local offices and then became attaché at Rome and in 1896 at Munich. In 1897 he was made Secretary to the German Embassy in Rome, where (after a year as Minister to Luxemburg) he became Ambassador in 1909 and in December, 1912, assisted in the renewal of the Triple Alliance. When he became Minister of Foreign Affairs early in 1913, succeeding Von Kiderlen-Waechter, it was supposed that his relations with Italy would assure Germany of that power's complete coöperation; but the next year the outbreak of the Great European War proved his plans faulty. Consult F. W. Wile, *Men around the Kaiser* (London, 1913). See War in Europe.

JAGUA, hä′gwȧ. See Cienfuegos.

JAGUAR, jȧ-gwär′ (from Brazilian *jaguara*), *Felis onca*. The largest, fiercest, and most interesting of all the wild cats of the New World. It is decidedly heavier than the puma, though the measurements usually given do not serve to bring out the difference. An average jaguar is 6 or 7 feet long, of which one-third or more is tail; the girth back of the shoulders is about 3 feet; the head is disproportionately large, and the limbs are massive. In color there is a very wide range of diversity, from a ground of dirty white or yellowish to almost black, southern animals being the lightest. In all cases, however, there are distinct and very characteristic markings, not unlike those of the leopard; but in the jaguar the rings cover more ground, are inclined to be more angular and broken, and each ring incloses one or more dark spots. See Plate of Wild Cats, accompanying article Cat.

The jaguar is found distributed very generally throughout South America, except in the colder parts of Patagonia (beyond lat. 40° S.) and on the highest mountains; it extends northward (or recently did) as far as Texas and possibly even into Louisiana and Arkansas, but apparently it has never crossed the Mississippi—at least not so as to get any foothold. The black variety is most common in Guiana, where it is sometimes called "tapir tiger," from its supposed fondness for tapirs as an article of food. The skull may easily be distinguished by a prominent tubercle on the anterior or nasal edge of the orbit.

The jaguar is essentially an animal of the forest and remarkably fond of water; so that the half-flooded jungles of the Amazon valley are its true and most suitable home, and there, in the season when large districts are submerged, it easily maintains for weeks together an almost entirely arboreal life. Nevertheless, a race of jaguars exists on the Pampas, a cold, treeless, and waterless desert, where they lurk in the tall grass or river-side thickets, working destruction among the ranchmen's horses, cattle, and sheep, and pouncing upon deer and the smaller mammals and reptiles of the region. Another curious fact is the enmity between the jaguar and the puma of the plains (and perhaps elsewhere), leading to constant battles in which the jaguar is likely to be worsted by its more active and aggressive antagonist. Foxes and wolves torment the big beast also, by following it about in hope of feeding upon the remains of its feasts, as jackals attend the African lion.

Jaguars are likely to remain in certain localities, in the vicinity of which they prowl at night, lying asleep or in ambush most of the daylight hours, and they seldom attack man unless provoked. They feed chiefly upon mammals and large reptiles. Monkeys and capybaras make a large part of the diet. Deer, sloths, tapirs, and manatees are also hunted, but peccaries are seldom attacked. The jaguar is sometimes killed by the great anteaters, whose sabre-like claws tear its bowels open even while the anteater itself is in the throes of death. Along the tropical rivers the jaguars wait for and seize turtles that come ashore to lay their eggs, turn them over, and gnaw them out of their shells. Even alligators and boas are occasionally seized, killed, and devoured, and jaguars are expert at snatching fish from overhanging banks. Much of this prey requires hard chasing; but the animal prefers to lie upon the low limb of a tree, or the top of a rock commanding some game trail or drinking place, and thence to leap upon its victims. The female jaguar usually produces two or three kittens at a birth, which are as beautiful and playful as young leopards. These have sometimes been tamed; but this species is perhaps the most savage and intractable of the great cats, and the kittens become dangerous with increasing years. See HUNTING BIG GAME.

The fullest account of this cat is by J. H. Porter in *Wild Beasts* (New York, 1894). Consult also: Alston, "Mammals," in Sclater and Salvin's *Biologia centrali-americana* (London, 1879–92); A. R. Wallace, *Travels on the Amazon* (ib., 1889); H. W. Bates, *The Naturalist on the Amazon* (7th ed., ib., 1895); W. H. Hudson, *The Naturalist in La Plata* (4th ed., ib., 1903).

JAGUARONDI, jä'gwȧ-rŏn'dē, or **YAGUARONDI.** A tropical American wild cat (*Felis jaguarondi*), remarkable for its very long body and tail in proportion to the limbs and for its uniform coloration, also for its isolated habitats. It inhabits Guiana, eastern Brazil, and Paraguay, and also northeastern Mexico, but, so far as known, is not to be found in the countries between. Its body is about 30 inches long and its tail fully 25 inches. The skull is elongated and flattened, the pupil of the eye round, and the nose is, as it were, strongly pinched in laterally. Its fur is gray, varying in some individuals towards brown, in others towards red, and is wholly unspotted. Compare EYRA.

JAHDE, yä'd*e*. An inlet of the North Sea. See JADE.

JAHN, yän, FRIEDRICH LUDWIG (1778–1852). A Prussian patriot and hero of the common people, an ardent advocate of German unity, and the father of popular gymnastics (Volks- or Vereinsturnen). He was born in the village of Lanz, developed a passion for Prussian and German history and the German language and literature during six years at the universities of Halle, Jena, and Greifswald, and interrupted his studies by frequent excursions to all parts of the country. His chief literary work, *German Nationality* (*Deutsches Volkstum*, 1810), falls in the period between the battle of Jena and the outbreak of the War of Liberation and gives fitting expression to his dominant idea. The years 1810–18 mark the culmination of his career. As a teacher in Berlin, he began to meet schoolboys outside the city gates on half-holiday afternoons for games and simple exercises, and then, as the numbers grew, an outdoor gymnasium was constructed and new exercises were devised, until in 1816 and 1817 more than 1000 "turners" were in attendance. Jahn saw in this active, wholesome, common life an opportunity to develop harmony and to kindle public spirit. Numerous gymnasia of the Berlin type were opened elsewhere in Prussia and other German states, with the help of Jahn's pupils and of *Die Deutsche Turnkunst* (1816), which he and they prepared. But the reactionary policy adopted by the Holy Alliance led to the general closing of these Turnplätze, and to Jahn's arrest (1819) on suspicion of "secret and most treasonable associations." Although finally acquitted (1825), he passed the remaining years of his life in comparative obscurity, most of them in the Thuringian town of Freyburg-on-the-Unstrut. There the Turnhalle has been built over his grave, and a Jahn Museum is near by. The Turnvereine in their present form began to appear after 1840, but they reflect the spirit and aims of Jahn.

JAHN, JOHANN (1750–1816). A distinguished Roman Catholic Orientalist and biblical critic. He was born at Tasswitz, Moravia, June 18, 1750, received his early education at Znaim and Olmütz and in 1772 entered the Premonstratensian convent of Bruck, where he took his vows in 1774 and was appointed professor of Oriental languages and biblical criticism. On the suppression of this convent, in 1784, Jahn was transferred to the same professorship in Olmütz, and finally (1789) to the University of Vienna, where after 1803 he also held the chair of dogmatic theology. So far as regards the modern Catholic literature of Germany, Jahn may be regarded as the father of biblical criticism. But the boldness of some of his opinions in his Einleitung aroused the alarm of the ecclesiastical authorities, and he was honorably removed from his chair in the university by being promoted to a canonry of St. Stephen's at Vienna in 1805. He continued, however, to pursue the same studies till his death, in Vienna, Aug. 16, 1816, and published many works in both departments, the most important of which, passing over his grammars, lexicons, and elementary books of the Hebrew, Syriac, Aramaic, and Arabic languages, are his *Einleitung in die* *göttlichen Schriften des alten Bundes* (2 vols., 1792; and again in 4 vols., 1802–03; Eng. trans. by Turner and Whittingham, New York, 1827); *Biblische Archäologie* (5 vols., 1797–1805; Eng. trans. by Upham, 3d ed., Andover, 1832); *Enchiridion Hermeneuticæ* (1812); an appendix of dissertations to this work (1813–15); and an edition of the Hebrew Bible (4 vols., 1806). Five years after his death a collection of *Remains* was published at Tübingen, the genuineness of which, although seemingly without reason, has been called in question. In 1822 his *Introduction, Archæology, Enchiridion,* and *Appendix Hermeneutica* were put on the index.

JAHN, Otto (1813–69). A German philologist and archæologist. He was born at Kiel and studied at Kiel, Leipzig, and Berlin. In 1837 he visited Paris, in 1838 Italy, and in 1839 became privatdocent in Kiel, but was in 1842 called to Greifswald, where he remained till 1847, when he became professor at Leipzig. His activity in the revolutionary movements of 1848–49 offended the Saxon government, and in 1851 he was deprived of his chair at the university; but he remained at Leipzig until 1855, when he was appointed professor of classical philology and archæology and director of the Academic Museum of Art at Bonn. Here he remained until in 1867 he was called to succeed Eduard Gerhard at Berlin. But before he could enter upon his new duties his health gave way, and he died in Göttingen, Sept. 9, 1869. Jahn was a many-sided scholar and produced valuable works in many fields. In classical philology may be mentioned his editions of *Persius* (1843); *Censorinus* (1845); *Juvenal* (1851; 4th ed. of Juvenal, Persius, and Sulpicia by Leo, 1910); Sophocles' *Electra* (1861; 3d ed. by A. Michaelis, 1882); *Pausaniæ Descriptio Arcis Athenarum* (1860; 3d ed. by A. Michaelis, 1901); Plato's *Symposium* (1864; 2d ed. by H. Usener, 1876); and the *Treatise on the Sublime,* attributed to Dionysius or Longinus (1867; 2d ed. by J. Vahlen, 1887). He published also a collection of essays on music, *Gesammelte Aufsätze über Musik* (1866), and a very important *Life of Mozart* (1856–59; 3d ed. by Deiters, 1889–91; Eng. trans. by Townsend, 1891). But it was in the field of classical archæology that Jahn's influence was most strongly exerted as a teacher and writer. His writings are for the most part short articles, which appeared in periodicals as university programmes, or in the proceedings of learned societies, especially in the *Berichte der königlichsächsischen Gesellschaft der Wissenschaften zu Leipzig.* Some were collected in *Archäologische Aufsätze* (1845), *Archäologische Beiträge* (1847), and *Aus der Altertumswissenschaft* (1868). Among his more important works were: *Die Ficoronische Cista* (1852); *Beschreibung der Vasensammlung König Ludwigs* (1854), with an epoch-making introduction on Greek vases; *Ueber den Aberglauben des bösen Blicks* (1855); *Darstellungen des Handwerks und Handelverkehrs,* three papers dealing with reliefs, vases, and paintings (1861, 1867, 1868); *Griechische Bilderchroniken,* published after his death by A. Michaelis (1873). Jahn's importance in the study of classical archæology is due to the stress he laid on exact and scientific method, and recognition of the limits of exact knowledge, in opposition to the symbolical school of interpretation, which had led to the wildest hypotheses, and of which the chief representatives were Panofka, Gerhard, and Braun. Consult Michaelis, *Allgemeine deutsche Biographie,* vol. xiii (Leipzig, 1881), and Sandys, *A History of Classical Scholarship,* vol. iii (Cambridge, 1908).

JÄHNS, yāns, Friedrich Wilhelm (1809–88). A German composer and musical critic, born at Berlin. He was educated for the operatic stage, but became a teacher of vocal music and founder and head of a musical Verein. Of his compositions his songs are best known, but his most valuable work was his criticism of Weber, *K. M. von Weber in seinen Werken* (1871), which is the most authoritative of the biographies of Weber and includes a complete thematic catalogue of his works together with critical comments. Jähns's splendid collection of Weberiana is now in the Berlin Royal Library.

JAI-ALAI, hī′ȧ-lī′. See Pelota.

JAIL DELIVERY, Commission of (OF. *jaiole, geole,* Fr. *geôle,* from Lat. *caveola,* dim. of *cavea,* cavity, cage, cave, from Lat. *cavus,* hollow, Gk. *κύαρ, kyar,* hole, from *κύειν, kyein,* to swell, to contain). One of the four royal commissions issued to judges of assize in England, under which they discharge their duties on circuit. The commission empowers the judges to try and deliver every prisoner who shall be in the jail when they arrive at the circuit town. It is directed to the judges, with whom are coupled the sergeants at law and king's counsel on the circuit, the clerk of assize, and the associate. Similar authority is conferred upon courts of oyer and terminer in the United States by general statutes. See Assize; Oyer and Terminer; and consult the authorities referred to under Criminal Law.

JAIL FEVER. See Typhus Fever.

JAÍME. See James.

JAÍME, hī′mȧ (Jaíme-Juan-Carlos-Alfonso-Felipe de Borbón-Anjou), Don (1870–), Duke of Madrid. A Carlist claimant of the Spanish throne, son of the Bourbon Prince called Don Carlos (1848–1909) and of Marguerite of Parma. He was born in Vevey, Switzerland, received a military education in Austria and England, and entered the Russian army, in which he became a colonel. He made his residence at Frohsdorf, near Vienna. His father's death in July, 1909, left him the head of the royal Spanish house of Bourbon-Anjou, and for a time in 1909 and 1910 the apparent lack of harmony between the Vatican and the Spanish government gave rise to rumors of a new Carlist uprising.

JAINISM, jīn′ĭz′m (from Skt. *jāina,* from *jina,* conqueror, a name given to the founder of the religion, from *ji,* to conquer). The name given to a schismatic religion of early India, which arose as a protest against Brahmanism about the same time as did Buddhism and became an important rival of the latter, although resembling it in many respects. It still retains a position as one of the most important among the living sects of the Hindus and claims over 1,000,000 believers. Many adherents to its teachings are found in every province of Upper Hindustan, in the cities along the Ganges, and in Calcutta, but more especially to the westward, in the states of Mewar and Merwara, in Gujarat, and southward along the upper part of the Malabar coast and scattered throughout the peninsula. The Jains are among the wealthiest and most influential members of the Hindu community, as they are devoted largely to mercantile pursuits. Accordingly their temples, the most famous of which are those of Mount Abu, are among the finest in India. In their way of living they are refined and simple, and in their manners they are gentle and attractive. It is now generally believed that Jainism antedated Buddhism in its beginnings, and that its chief expounder, Vardhamāna Mahavira, was an older contemporary of the Buddha. The name *Mahāvira* itself is appellative and means 'the great hero.' He is also called *Kevalin* or *Sarvajna* (omniscient), *Siddha* (accomplished), *Tīrthakara* (finder of the ford), etc. Another name given to the deified saints of the faith is *Arhat* (venerable, holy); accordingly the followers of these spiritual leaders are sometimes called Arhatas. Mahavira, the founder of Jainism, arose in the sixth century B.C. in the region not far from the holy city of Benares, which was the territory likewise that gave birth to Buddhism. His family name was Jnātriputra, and he is referred to in the Buddhist writings as Nataputta, which was the form of the name in his own dialect of Magadha (q.v.). His father's name in the same vernacular appears as Siddhattha; his mother's as Trisala. It is said that on their death, in his thirtieth year, he renounced his home and petty kingdom, gave up his wife and his daughter, and became a religious devotee and recluse. For 12 years he practiced the most rigorous kind of asceticism and then devoted the remaining 30 years of his life to preaching and teaching and, like Buddha, to organizing his faith and the religious order of his community. His death must have occurred before Buddha's, as the latter refers to that event. The reputed teacher of Mahavira was Parśva or Parśvanatha, who belonged to the pre-Buddhistic sect of the Nirgranthas (without bonds, free from ties, emancipated), and this religious master must have flourished not later than the seventh century B.C. There is evidence also of Mahavira's having also been influenced by a stern ascetic named Gosala, who was for a time his associate and pupil, but afterward his rival and the leader of another sect of minor importance.

The tenets of the Jainas or Arhatas are in several respects analogous to those of the Buddhists (see BUDDHISM), and like them go back to the principles of the Sankhya and Yoga (qq.v.) philosophy; but they resemble in others those of the Brahmanical Hindus. With the Buddhists they share in the denial of the divine origin and authority of the Vedas, and in the worship of certain saints, whom they consider superior to the other beings of the pantheon. They differ, indeed, from them in regard to the history of these personages, but the original notion which prevails in both worships is the same. With the Brahmanical Hindus, on the other hand, they agree in admitting the institution of caste, in performing the ceremonies called *Samskaras* (see SAMSKARA), and in recognizing some of the subordinate deities of the Hindu pantheon, at least apparently, as they do not pay especial homage to them, and as they disregard completely all those Brahmanical rites which involve the destruction of animal life. Their teaching, however, transcends the bounds of the Aryan world, being intended also for the despised Sudras and Mlechhas (Europeans). It deserves notice, too, that though rejecting in general the authority of the Vedas, they admit it and quote Vedic texts if the doctrines of the latter are conformable to the Jaina tenets. The Jainas are thoroughgoing hylozoists, recognizing a psychic element (*jīva*) in every material object. Apart from this they have no well-rounded-out metaphysical theory, as they hold the doctrine (*syād-vāda*) that "yes" and "no" may at the same time be predicated.

According to their doctrine, all objects, material or abstract, are arranged under nine categories, called *tattvas*, truth, or principles, of which the ninth and last is called *mōkṣa*, deliverance or liberation of the vital spirit from the bonds of action, i.e., final emancipation, salvation. It is identical with the Nirvana of the Buddhist. To reach such an emancipation the most stringent asceticism and self-mortification for 12 years are essential. Salvation can be obtained only through such observances and the "Three Gems," which are the treasures of the faith. These are "right knowledge, right conception, and right actions." These latter, which are synonymous with virtue, are fivefold: (1) noninjury (*ahiṃsā*); (2) kindness, and true but pleasant speaking; (3) uprightness, especially shown by nonstealing; (4) purity in thought, word, and deed; (5) renunciation of worldly interests. This freeing of the spirit from the bonds of material things will come through successive reincarnations; it will mean true release, but the spirit will retain its individuality.

The principles of faith, as mentioned before, are common to all classes of Jainas, but some differences occur in the practice of their duties, as they are divided into religious and lay orders, *Yatis* (which among the Svetambaras include women), and *Srāvakas* or *Upāsakas*. Both, of course, must place implicit belief in the doctrines of their saints; but the *Yati* has to lead a life of abstinence, silence, and continence. He should wear a thin cloth over his mouth to prevent insects from flying into it, and he should carry a brush to sweep the place on which he is about to sit, to remove any living creature out of the way of danger. Their highest law of duty is not to harm any living creature, and their doctrine of metempsychosis does not stop at animal existences, but it includes the inanimate world as well. The saintly *Yati* may dispense with all acts of worship; while the *Srāvaka* has to add to the observance of the religious and moral duties the practical worship of the saints and a profound reverence for his more pious brethren. The secular Jain must, like the ascetic, practice the four virtues—liberality, gentleness, piety, and penance; he must govern his mind, tongue, and acts; abstain at certain seasons from salt, flowers, green fruits, roots, honey, grapes, tobacco; drink water thrice strained, and never leave a liquid uncovered lest an insect should be drowned in it; it is his duty also to visit daily a temple where some of the images of the Jain saints are placed, walk round it three times, make an obeisance to the image, and make offerings of fruits or flowers, while pronouncing some such formula as "Salutation to the Saints, to the Pure Existences, to the Sages, to the Teachers, to all the Devout in the world." The reader in a Jain temple is a Yati, but the ministrant priest is not seldom a Brahman, and the presence of such Brahmanical ministrants seems to have introduced several innovations in their worship. In Upper India the ritual in use is often intermixed with formulas belonging more properly to the Saiva and Sakta worship, and images of Siva and his consort have their place in Jaina temples. In the south of India they appear, as mentioned before, to observe also all the essential rites or Samskaras of the Brahmanical Hindu. The festivals of the Jainas are especially those relating to events in the life of their deified saints; but they observe also several common to other Hindus, as the spring festival, the Sripanchami, and others.

The Jains are divided into two principal divisions, *Digambaras* and *Svetambaras*. The former word means 'sky-clad,' or naked, and it is thought that the Gymnosophists, or naked devotees, to whom the Greek writers allude, were Jains; but this is not quite certain. (See GYMNOSOPHISTS.) They seem to be identical with the Niganthas (Nirgranthas) mentioned in Buddhist Pali writings and in an inscription of Asoka. If this identification is correct, Nataputta, a leader of the Nigantha sect, is identical with Jnātriputra Mahāvīra. At the present day ascetics of the Digambara class wear colored garments and confine the disuse of clothes to the period of their meals. *Svetambara* means 'one who wears white garments'; but the differences between these two very ancient divisions are far from being restricted to that of dress; it is said to comprehend a list of 700 topics, of which 84 are considered to be of paramount importance. In the south of India the Jains are divided into two castes; in Upper Hindustan they are all of one caste. It is remarkable, however, that among themselves they recognize a number of families between which no intermarriage can take place, and that they resemble in this respect also the ancient Brahmanical Hindus, who established similar restrictions in their religious codes.

As regards the pantheon of the Jaina creed it is more fantastic than that of the Brahmanic sects, whence it is borrowed to a great extent, but without any of the poetical and philosophical interest which inheres in the gods of the Vedic time. The highest rank among their numberless hosts of divine beings—divided by them into four classes, with various subdivisions—they assign to the deified saints, whom they call *Jina*, *Arhat*, or *Tirthakara*, i.e., prophet, besides a variety of other generic names. The Jainas enumerate 24 Tirthakaras of their past age, 24 of the present, and 24 of the age to come; and they invest these holy personages with 36 superhuman attributes of the most extravagant character. Notwithstanding the sameness of these attributes, they distinguish the 24 Jinas of the present age from each other in color, stature, and longevity. Two of them are red, two white, two blue, two black; the rest are of a golden hue or a yellowish brown. The other two peculiarities are regulated by them with equal precision, and according to a system of decrement, from Rishabha, the first Jina, who was 500 poles in stature, and lived 8,400,000 great years, down to Mahavira, the twenty-fourth, who had degenerated to the size of a man and was no more than 40 years on earth, the age of his predecessor, Parśvanatha, not exceeding 100 years. The present worship is almost restricted to the last two Tirthakaras; and these may be considered as historical personages. As, moreover, among the disciples of Mahavira there is one Indrabhati, who is called Gautama, and as Gautama is also a name of the founder of the Buddha faith, it has been thought that Gautama Sakyamuni, the Buddha, is alluded to; but this is not accepted, although Buddha calls himself by the title of Jina (the conquering one), and the Buddhist scriptures also sometimes speak of him as the twenty-fifth Buddha or Jina.

Jainism, in contrast to Buddhism, never spread beyond the bounds of India; on the other hand, it has lived longer than Buddhism in the land that gave it birth. Prakrit is the canonical speech of Jainism, but the sacred literature of the Jains is uninteresting or stupid.

Bibliography. Among the best older essays on the tenets, mythology, observances, and literature of this sect are those of Wilson, *Essays*, vol. i (London, 1862), and Colebrooke, in his *Miscellaneous Essays*, ed. by Cowell, vol. ii (ib., 1873). More recent and important is the sketch by Monier-Williams, in the *Journal of the Royal Asiatic Society*, vol. xx (London, 1888); Jacobi (q.v.), "Jaina Sutras," in the *Sacred Books of the East*, vols. xxii, xlv (Oxford, 1884–95); Bühler, *On the Indian Sect of the Jainas*, translated from the German by Burgess (London, 1903); "Eine Jaina Dogmatik," in *Deutsche Morgenländ. Gesellsch., Zeitschrift*, vol. lx, pp. 287–325, 512–51 (Leipzig, 1906); the excellent outline by Hopkins, "Jainism," in *Religion of India* (Boston, 1895); Schubring, *Acārānga-sūtra, erster Srutaskandha*, text and glossary (Leipzig, 1910); Jhaverī, *The First Principles of the Jain Philosophy* (London, 1910); Warren, *Jainism in Western Garb as a Solution to Life's Great Problems* (Madras, 1912). On Jaina literature, consult: Weber, *Sacred Literature of the Jains*, translated by Smyth (Bombay, 1893); Barodia, *History and Literature of Jainism* (ib., 1909). On Jain architecture: Fergusson, *Cave Temples of India* (London, 1880), and Burgess, *Buddhist and Jaina Caves* (ib., 1881–83). On Jaina epigraphy: Guérinot, *Répertoire d'épigraphie Jaina précédé d'une esquisse de l'histoire du Jainisme d'après les inscriptions* (Paris, 1908). For a bibliography, consult the *List of Sanskrit and Hindi Manuscripts Purchased by Order of Government and Deposited in the Sanskrit College, Benares, during the Years 1902, 1905–06, and 1909* (Allahabad, 1904–10); Guérinot, *Essai de bibliographie Jaina* (Paris, 1906); Hüttemann, *Die Jnataerzählungen im sechsten Anga des Kanons der Jinisten* (Strassburg, 1907); Barnett, *The Antagaḍa-dasāo and Aṇuttarovavāiya-dasāo*, translated from the Prakrit (London, 1907); Guérinot, "Notes de bibliographie Jaina," in the *Journal Asiatique*, vol. xiv, pp. 47–148 (Paris, 1909).

JAINTIA (jīn′tī-ȧ) **HILLS.** A mountainous region of Assam, British India, covering an area of about 2000 square miles. With the Khasi Hills it gives its name to a governmental district. Coal and limestone are the chief mineral products; rice is grown. The hill villages are inhabited chiefly by Panars, a race which differs in language and creed from the Khasis, who call them Syntengs.

JAIPUR, jī-pōōr′, or **JEYPORE**, -pōr′. A native Rajputana state, India, bordering on Bikanir, Bhartpur, Gwalior, Jodhpur, and other regions (Map: India, C 3). Area, 15,579 square miles. The surface is generally level except to the north and northwest, where it is broken by a spur of the Aravalli Mountains. It is sparsely watered, but this defect is gradually being overcome by extensive irrigation works. Corn, wheat, barley, cotton, tobacco, sugar cane, and the poppy are cultivated, and cattle are raised.

Woolen and cotton cloths, chintz, statuary, pottery, brass and lacquer work are manufactured. Copper, cobalt, black and white marble are found in the hills. Capital, Jaipur. Pop., 1901, 2,658,666; 1911, 2,636,647.

JAIPUR, or **JEYPORE.** The capital of the protected state of the same name, Rajputana. It is perhaps the handsomest and most regularly built of the native towns of India (Map: India, C 3). It lies 150 miles west of Agra. It is built on a plain surrounded by fort-capped hills, except to the southwest, where the plain merges into a desert. It was founded in 1728, is inclosed by a fortified wall, 20 feet thick, pierced by seven gates, and has paved streets 111 feet wide, laid out at right angles. The principal buildings are the Nahargarh, an almost inaccessible fort, dominating the city from the northwest; the palace of the Maharaja with its beautiful pleasure gardens; the Ishwari Minar (minaret piercing heaven); the splendid Maharajan chattris or cenotaphs; the observatory; Hall of the Winds; and the Mayo Hospital. Jaipur has municipal water works supplied by a tributary stream of the Chumbul, is lighted by gas, and its fine public park contains a zoölogical garden covering 70 acres. Its schools include the Maharaja's College, the Oriental College, the Sanskrit College, and a school of art. It is the seat of a British residency and is an important commercial and industrial centre with flourishing bazars and banking and trading establishments. Colored muslins, carpets, cloths, statuary, gold enamel ware, pottery, brass work, and jewelry constitute the chief manufactures. The town has two large cotton compresses. Pop., 1901, 160,167; 1911, 137,098. Amber, the ancient capital of Jaipur, 5 miles distant, has picturesque ruins of a fort, a palace, a mosque, temples, and tombs.

JAK. A tropical tree closely related to the breadfruit tree. See JACK TREE.

JAKIE, jä'kē (South American name). A South American frog (*Pseudis paradoxa*), of the family Cystignathidæ, remarkable for the relatively great size of its tadpoles. It is entirely aquatic and richly colored with bright green, bronze, and black above and shining yellow below, but all these colors disappear in a dull-brown hue immediately after death. The length of the adult is only from 2 to 2½ inches, yet its tadpoles reach a length of more than 10 inches, two-thirds of which consists of a thick, muscular tail. As the transformation proceeds, it shrinks steadily, until, when ready to leave the water, the tadpole is hardly more than 1 inch in length.

JAKJOKERTA, jäk'yō-kĕr'tȧ. A city of Java. See JOKJOKARTA.

JAKOB, yä'kōp, LUDWIG HEINRICH VON (1759–1827). A German economist, born at Wettin. He studied at the University of Halle, where he became professor of philosophy in 1791. When the university was suppressed by Napoleon in 1807, he accepted the chair of political economy at Kharkov, Russia, was appointed to a commission to examine the finances of the Empire, and subsequently held other posts under the Russian government. In 1816 he returned to Halle as professor of political economy. His writings include: *Prolegomena zur praktischen Philosophie* (1787); *Grundriss der allgemeinen Logik* (1788; 4th ed., 1800); *Antimachiavell* (1794; 2d ed., 1796); *Grundsätze der Nationalökonomie* (1805; 3d ed., 1825); *Entwurf eines Criminalgesetzbuchs für das russische Reich* (1818); *Einleitung in das Studium der Staatswissenschaften* (1819); *Staatsfinanzwissenschaft* (2 vols., 1821).

JAKUNS, jȧ-ko͞onz'. A mixed race, inhabiting the protected State of Johore at the extreme south of the Malay Peninsula. They are the offspring of the Malays with the more aboriginal Sakai (q.v.) of the interior. The Jakuns seem rather taller, lighter in color, and finer-featured than the Sakai, who are generally classed as Negritos. Information concerning these people will be found in Stevens, "Anthropologische Bemerkungen über die Eingeborenen von Malacca," in the *Zeitschrift für Ethnologie* (Berlin, 1897).

JAKUTSK, yȧ-ko͞otsk'. Another spelling for the name of a territory and its capital in Siberia. See under YAKUTSK.

JAL, zhȧl, AUGUSTE (1795–1873). A French author, born at Lyons. He was educated at the naval school in Brest and led a company of the cadets in the defense of Paris during the Hundred Days (1815). His first literary work was done on *Le Fureteur*, *Le Miroir*, and *La Pandore*, liberal journals. Afterward he became well known as an art critic. In 1831 he received official charge of the marine archives and wrote in this connection a nautical glossary and *L'Archéologie navale* (1839). The fruit of much of his labor is embodied in his great *Dictionnaire critique de biographie et d'histoire* (1864). He also wrote a memoir, published posthumously, *Souvenirs d'un homme de lettres* (1877), and several other works on art and archæology.

JALALABAD, ja-lä'lȧ-bäd'. A town of Afghanistan. See JELALABAD.

JALAL-UD-DIN (jȧ-lȧl'-ụd-dēn') **MUHAM'MAD.** See AKBAR.

JALĀL-UD-DĪN RŪMĪ, ro͞o'mē (1207–73). A Persian philosopher and poet, and the greatest of all the mystics of the Orient. He was born at Balkh in Khorassan, of noble and wealthy parents, and under the careful training of his father, Baha-ud-Dīn, a scholar of wide repute, early became a visionary and a mystic. He subsequently studied at Aleppo and Damascus and in 1231 succeeded his father as the head of the college at Iconium (Konieh) in Asia Minor. He came for three years under the influence of a wandering dervish, Shams-ud-Dīn of Tabriz, whose mysterious death in 1247 he commemorated by founding the Maulaw Order of Dervishes, a Sufistic sect. For them he wrote the *Mathnawī*, a collection of tales and moral precepts containing 40,000 couplets, in six books, in imitation of similar poems by Senayi and Farid-ud-Dīn Attar. This didactic work, which surpasses its models, has been partly translated into English by Redhouse (London, 1881), Whinfield (ib., 1887 and 1901), and Nicholson (1901), and into German by Rosen (Leipzig, 1849). Another work, the *Diwān*, a collection of lyrics of high poetic merit and great originality, has also been preserved and was published, with a translation and notes, by Rosenzweig (Vienna, 1838). Of all the Persian Sufis, Jalāl-ud-Dīn is the most important. To him the Ego, the world, and the Divine are one (see SUFISM), and in his works for the first time in Persian mysticism we find the doctrine of transmigration taught. Consult: Ethé, "Neupersische Literatur," in Geiger and Kuhn, *Grundriss der iranischen Philologie*, vol. ii (Strassburg, 1896–1904); Browne, *Literary History of Persia* (New York, 1906); Davis, *The Persian Mystics, Jalāl-*

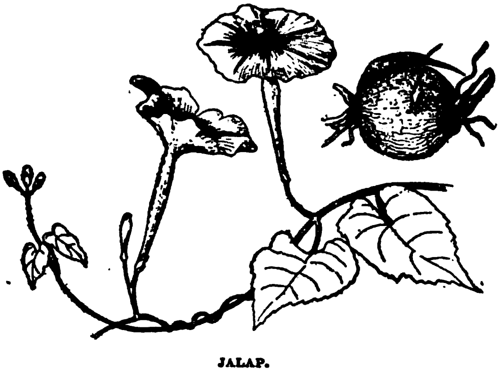
u'd-dín Rúmí (ib., 1908); Wilson, *The Masnavi, Book II, Translated for the First Time from the Persian into Prose* (London, 1910).

JALANDHAR, jŭl′an-dẽr, or **JULLUNDER.** A division of the Punjab (q.v.), British India (Map: India, C 2). It comprises the districts of Kangra, Hoshiarpur, Jalandhar, Ludhiana, and Firozpur, and has an area of 19,394 square miles. Pop., 1901, 4,305,724; 1911, 3,967,724. Capital, Jalandhar.

JALANDHAR, or **JULLUNDER.** The capital of a district and division of the same name in the Punjab, British India, 260 miles northwest of Delhi (Map: India, C 2). It is in a productive agricultural and sporting district and anciently was a fortified place of importance, the capital of the Rajput Katoch Kingdom as early as the fourth century B.C. It manufactures silk, flour, cabinetwork, iron, and brass. Its fine cantonment, where a garrison of two batteries of artillery is stationed, inclosing the public gardens, covers 7½ square miles. Pop., 1901, 67,735; 1911, 69,318.

JAL′AP (Sp. *jalapa*). A well-known purgative medicine. It is the root of *Ipomœa jalapa*, a plant of the natural order Convolvulaceæ. It is found in Mexico, at an elevation of about 6000 feet above the level of the sea, in the neighborhood of the town of Jalapa, or Xalapa, from which its name is derived. It is a perennial twining plant, with large flowers and a turnip-like root, varying from the size of a hazelnut to that of a man's fist. The roots when fresh are white and fleshy and abound in a milky juice. They are prepared for the market by drying. Jalap was long confused with other plants, among them *Mirabilis jalapa*, known in flower gardens as *marvel of Peru*.

Jalap seems to have been first introduced into England as a medicine about 1609.



JALAP.

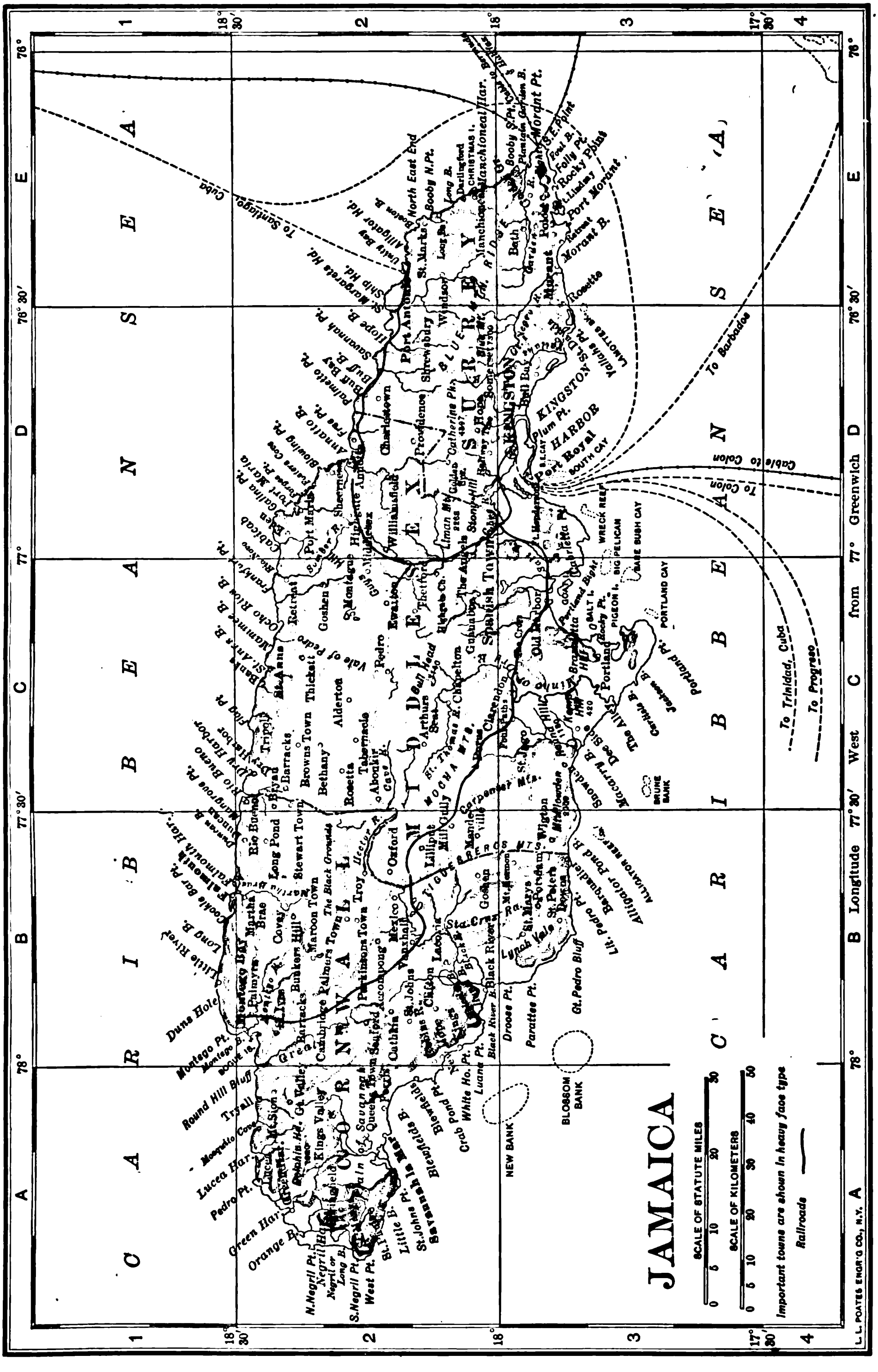
The dried roots are brown and wrinkled externally and of a deep yellowish-gray color internally; their odor is faint and disagreeable, and their taste is nauseous. The active ingredient is the resinous portion, which contains convolvulin. Jalap resin may be distinguished from common resin by its insolubility in volatile oils. Jalap is a valuable cathartic, but is seldom given alone. It is an ingredient of the compound cathartic pill of the United States Pharmacopœia. Its purgative action is increased by the addition of a little calomel, and its hydragogue action by bitartrate of potash, while its tendency to produce griping is obviated by the addition of a little ginger. In the form of compound jalap powder, which consists of one part of powdered jalap, two parts of bitartrate of potash, and a little ginger, it is of great service in some kinds of dropsy in consequence of its hydragogue action.

JALAPA, or **XALAPA,** ʜȧ-lä′pȧ. The capital of the State of Vera Cruz, Mexico, situated at an elevation of 4800 feet on the slope of the extinct volcano of Cofre de Perote, 60 miles northwest of Vera Cruz (Map: Mexico, L 8). The town is surrounded by gardens and is much frequented as a health resort by the people of Vera Cruz. It is well built, with a handsome plaza and beautiful promenades in the suburbs, and has a fine cathedral, containing paintings by the Spanish masters, a Franciscan convent built in 1556, various schools, and hospitals. It has several times been the capital of the state, and prior to the advent of railways had considerable importance, being on the route connecting Mexico City with Vera Cruz. It now carries on some trade in the agricultural products of the region and has a number of small cotton and cigar factories. Pop., 1900, 20,388; 1910, 24,816.

JALISCO, or **XALISCO,** ʜȧ-lē′skō. One of the states of Mexico, bounded by the Territory of Tepic and the states of Durango, Zacatecas, and Aguas Calientes on the north, Guanajuato and Michoacán on the east, Michoacán and Colima on the south, and the Pacific Ocean on the west (Map: Mexico, G 7). Area, 33,495 square miles. The narrow strip of coast land is low and well indented. The western part of the state rises towards the Sierra Madre in a series of terraced plateaus, on which are scattered a number of volcanic cones and isolated peaks, the two highest of which are the volcano Colima (12,750 feet) and the extinct Nevado (14,854 feet). The central portion is occupied by the Sierra Madre del Pacífico, which divides the state into two parts, the eastern half forming a part of the great Mexican central plateau, Anahuac (q.v.), with an elevation of over 5000 feet. Jalisco has numerous lakes, including the largest lake of Mexico, Chapala (q.v.), drained by the Río Grande de Santiago, which with its tributary, the Verde, is the chief river of the state. The climate is hot and unhealthful in the lowlands of the coast, but moderate in the interior. The soil is very fertile along the rivers and in the eastern part of the state. Corn, wheat, tobacco, cotton, sugar, and indigo are the chief agricultural products. Stock raising is also carried on extensively, and rich silver mines are worked. The chief manufactured products are coarse cotton and woolen goods, pottery, saddlery, tequila (a spirituous liquor), and products of tobacco. Pop., 1910, 1,208,855, consisting largely of Indians. The state is one of the most prosperous and wealthy of Mexico. The capital is Guadalajara (q.v.). Jalisco once formed part of the Kingdom of Nueva Galicia. Consult T. E. Smith, *Handbook of the Mineral Resources of the State of Jalisco* (Guadalajara, 1905).

JALUIT, jä′lo͞ot. See MARSHALL ISLANDS.

JAMAICA, jȧ-mā′kȧ. The largest of the British West Indian Islands, situated 90 miles south of Cuba and 100 miles west of Haiti, between lat. 17° 43′ and 18° 32′ N. and long. 76° 11′ and 78° 21′ W. (Map: West Indies, C 3). It is 144 miles in its greatest length and about 50 miles in its widest part. Area, about 4207 square miles. The surface rises gradually from the lowlands of the west coast


JAMAICA
SCALE OF STATUTE MILES
0 5 10 20 30
SCALE OF KILOMETERS
0 5 10 20 30 40 50
Important towns are shown in heavy face type
Railroads
CARIBBEAN SEA
CARIBBEAN SEA
78° 77°30' 77° 76°30' 76°
18°30' 18° 17°30'
A B C D E
1 2 3 4
West Longitude 77° from Greenwich
To Santiago, Cuba
To Trinidad, Cuba
To Progreso
To Colon
Cable to Colon
To Barbados
KINGSTON
KINGSTON HARBOR
Port Royal
Spanish Town
Port Antonio
Montego Bay
Falmouth
St. Ann's B.
Port Maria
Morant Pt.
Morant B.
Portland Pt.
Negril Pt.
Savanna la Mar
Black River
Lucea Har.
Mandeville
Old Harbor
BLUE MTS.
MAY DAY MTS.
CORNWALL
MIDDLESEX
SURREY
Blossom Bank
New Bank
Pedro Bank
Portland Cay
Wreck Reef
Alligator Reef
L. L. POATES ENGR'G CO., N.Y.

towards the mountainous regions of the central part, where some of the peaks are over 7000 feet high. The most important chain is the Blue Mountains, occupying the east end of the island and containing the highest summits. Jamaica is favored with a well-indented coast line. There are about 16 harbors, the most important being on the south coast; besides, there are numerous smaller inlets affording safe anchorage for small vessels. The rivers of the island are numerous and flow north and south, the central mountain range forming the watershed between the two systems. Most of the rivers are unnavigable on account of their turbulence and occasionally cause disastrous floods. The most important are the Plantain Garden River, the Black River, Salt River, and Cabarita. Some of the streams are utilized for irrigating the sugar and fruit plantations. The soil is composed largely of sedimentary deposits derived from the red and white limestone formations which overlie the primitive granite that forms the main structure of the island. Some volcanic rocks in the eastern part of the island and a number of hot mineral springs afford the only evidence of volcanic action.

In the general characteristics of its flora and fauna Jamaica resembles the other West Indian islands. (See West Indies.) Its flora, which is remarkably rich and varied, includes Jamaica cedar, logwood, fustic, plantain, mango, bamboo, cactus, and acacia. The allspice tree (*Pimenta officinalis*) is found almost exclusively here. Venomous snakes are unknown. Bird life includes humming birds, the green tody, cuckoos, tyrant birds, parrots, and buzzards. The climate of Jamaica is, next to its remarkable vegetation, the principal attraction of the island. Although it is quite humid and warm near the coast, the higher regions enjoy a delightfully mild, dry, and equable climate, with an annual range of temperature scarcely exceeding ten degrees, and with especially salutary effect in cases of pulmonary diseases.

The chief industry is agriculture. The mountainous regions are given up largely to pasture, while the plantations are found mostly in the lowlands. Of the total area, about 2,600,000 acres are reported as capable of productivity. The cultivated area in 1911–12 was stated at 941,708 acres; in 1912–13, 922,633 acres. The latter area comprised: tilled lands, 267,276 acres; guinea grass, 152,527; common pasture, 430,064; common pasture and pimento, 72,766. Of the tilled lands, bananas occupied 81,071 acres; ground provisions and mixed crops, 99,632; sugar cane, 31,753; coffee, 22,275; coconuts, 17,377; cacao, 11,236; oranges, 1715; other crops, 2217. The cultivation of sugar has declined in recent years, and that of fruit, especially bananas, has increased. The banana output in 1912 was nearly 13,400,000 bunches, valued at £1,241,000; coffee, £274,700; cacao, £139,800; sugar, £132,800; dyewoods, £88,500; pimento, £78,400; rum, £67,100. The land is divided into small holdings, those of five acres and less numbering over 60,600 out of the total number of about 80,000; but since the resumption of East Indian immigration in 1891, the large estates have been increasing in number. The chief industrial establishments are the sugar mills, oil presses, tanneries, etc.

The trade of the colony is chiefly with the United States and the United Kingdom, Canada ranking third; the former preponderance of the British trade has been lost in favor of the United States. Imports and exports increased from £2,014,477 and £1,543,267 respectively in the year 1903–04 to £3,050,479 and £2,709,283 in 1912. In the latter year imports from and exports to the United Kingdom were valued at £1,333,352 and £358,516; United States, £1,273,389 and £1,618,614; Canada, £291,363 and £148,943.

The chief exports are fruit, sugar, logwood extract, cacao, rum, coffee, and pimento. The proportion of sugar in the exports of the colony shows a decline from 30.6 per cent in 1879 to 5.1 in 1912; that of rum from 14.4 per cent in 1879 to 2.6 in 1912; coffee declined from 18.3 per cent to 10.7 during the same period; while fruit showed an increase from 2.9 per cent to 54.7 during the same period. The imports are composed chiefly of cotton manufactures, fish, and flour.

Jamaica is administered by a governor, assisted by a privy council, appointed by the crown, and a legislative council consisting of 10 members nominated by the governor, and 14 elected by limited suffrage, besides five ex-officio members and the governor. All financial measures must receive the approval of the governor before they are submitted to the consideration of the Legislative Council. For administrative purposes the island is divided into 15 parishes, administered by elective boards. Administratively attached to Jamaica are the Turks, Caicos, and Cayman islands, and Morant and Pedro cays. Justice is administered by a high court, circuit courts, and by resident magistrates in the parishes. The revenue and expenditure of the colony for the year 1912–13 amounted respectively to £1,432,400 and £1,549,667. A little over 30 per cent of the revenue was derived from customs duties. The public debt in 1912 was £3,843,974. The roads of the island are under the control of the government, which also owns and operates the railways. The railway extends from Kingston to Montego Bay (112.7 miles) and to Ewerton, in the other direction, by a branch from Spanish Town (17.2 miles); also to Port Antonio by a branch from Bogwalk, on the Ewerton branch (54.5 miles); and from May Pen to Chapelton (13 miles); total length open in 1914, 197.4 miles. There are numerous fortifications, and several ships of the royal navy are maintained at the North American and West India naval station.

The population of Jamaica, according to several censuses, is shown below:

YEAR	White	Colored	Black	Others	Total
1861...	13,816	81,065	346,374	......	441,255
1871...	13,101	100,346	392,707	......	506,154
1881...	14,432	109,946	444,186	12,240	580,804
1891...	14,692	121,955	488,624	14,220	639,491
1911...	15,605	163,201	630,181	*22,396	831,383

* East Indians, 17,380; Chinese, 2111; not stated, 2905.

Since 1891 there has been a considerable East Indian immigration; in 1912 the East Indians numbered 18,631, of whom 2841 were under indenture. In 1912–13 the birth rate in Jamaica was 38.8; death rate, 25.1; marriage rate, 3.7. The Maroons, the descendants of fugitive slaves, are few in number and do not mix with the other inhabitants of the island. The negroes are engaged principally in agriculture and are to some extent peasant proprietors. The colored population is represented largely in the trades and professions, while the Chinese are chiefly shopkeepers. Education is optional and to some extent supported by the government. In 1912–13 there were 698 public elementary schools, with an enrollment of 100,179 and an average attendance of 60,900. There is no established church. Accurate religious statistics are not obtainable, but the most numerous churches are Anglican (237), Baptist (200), Wesleyan Methodist (127), and Presbyterian (82). The larger towns are Kingston (q.v.), the capital, with 57,379 inhabitants in 1911; Spanish Town, 7119; Port Antonio, 7074; Montego Bay, 6616; Savanna-la-Mar, 3400.

Jamaica was discovered by Columbus during his second voyage in May, 1494, and was taken possession of by the Spaniards in 1509. The office of governor was held by the descendants of Columbus till the extinction of the line. Under Spanish rule the native population rapidly dwindled away, and before the middle of the seventeenth century had become extinct. In May, 1655, a British expedition under Admirals Penn and Venables captured the island, and England was confirmed in the possession of it by the Treaty of Madrid in 1670. The sugar industry, which had its inception in 1673, soon developed into great importance, and the demand for plantation labor led to the importation of negro slaves. Between 1700 and 1786 more than 600,000 negroes were brought into the island. Many of them escaped to the forests of the interior, where they led a life of semibrigandage and threatened seriously the prosperity of the settlements on the coast. A fierce contest was carried on with them from 1715 to 1738, and they were not subdued completely till 1796. A negro insurrection in 1831 hastened the approach of emancipation, which had been agitated for a long time in England. In 1833 an Emancipation Act was passed, providing for the total extinction of slavery after Aug. 1, 1838, and awarding the sum of $29,987,000 (£6,161,927) as compensation to the owners of the liberated slaves, who numbered 309,338. The effects of emancipation on the economic condition of the country were disastrous at first. The freedmen abandoned the plantations in large numbers and took possession of the unoccupied lands in the interior. Labor to take their place could be obtained only with great difficulty, and bitter feelings of hostility between whites and blacks resulted. In October, 1865, the negroes at Port Morant, in the eastern part of the island, rose in resistance to the process of the courts; martial law was declared by Governor Eyre, and the insurrection was speedily put down—with excessive cruelty, as was maintained by the negrophiles, or with commendable firmness, as was asserted by a government commission sent out to investigate the affair. As a result of the social conflicts, the old parliamentary government of Jamaica was abolished in December, 1866, and the island was reduced to the grade of a crown colony. Representative government was partially reëstablished in 1884. On Jan. 15, 1907, an earthquake caused the death of over 600 persons and the destruction of much property. In November, 1912, a disastrous cyclone visited the western part of the island.

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JAMAICA. The county seat of Queens Co., N. Y., comprising the fourth ward of the Borough of Queens, New York City, 10 miles by rail from the centre of Brooklyn, on the Long Island Railroad (Map: New York City, Greater New York, G 6). It is essentially a residential suburb of New York and Brooklyn and contains King's Park, the City Training School, and many fine homes. There are also a number of carriage factories. Jamaica was settled by the Dutch as early as 1656, and several pre-Revolutionary structures still stand.

JAMAICA BARK. See Exostemma.

JAMAICA BULLACE PLUM. A West Indian fruit. See Melicocca.

JAMAICA KINO. A West Indian fruit. See Seaside Grape.

JAMAICA SORREL. See Hibiscus.

JAMAK. See Janizaries.

JAMALTESA, hä'mäl-tā'sȧ, or **ESPINTO**, ȧ-spēn'tō. The locality of a group of ruins, situated 20 miles north of Comayagua in Honduras. They exhibit a series of mounds whose summits are reached by flights of steps, above which are remains of considerable edifices. The largest of these mounds stands in the centre of a broad terrace, and the smaller ones are arranged at regular distances from it. Excavations in the surrounding country have brought to light many ancient vases and pieces of sculpture, which indicate, in the excellence of their workmanship, the existence of a high standard of art and marked ability.

JAMBLICHUS. See Iamblichus.

JAMBOLI. See Yamboli.

JAMBRES. See Jannes.

JAMBUDVIPA, jām'bụ-dwē'pȧ (Skt. *jambudvipa*, rose-apple tree island). In the Mahabharata, the first of the seven dvipas, or continents, into which the world is divided. It is surrounded by seven oceans and contains the dwelling place of the gods, the mountain of Meru, on which grows a great rose-apple tree, which gives the continent its name. Of the nine countries into which it is divided by mountain ranges, Bharata, or India, is the most important and in poetry and Buddhistic works bears the name of the whole continent.

JAMES (Lat. *Jacobus*, Gk. 'Ιάκωβος, *Iakōbos*, Heb. *Ya'ăqōbh*). The name given certainly to three and probably to four men in the New Testament. Two of them—James, the son of Zebedee, and James, the son of Alphæus—were members of the Twelve (Mark iii. 17, 18). A third was a brother of the Lord (Gal. i. 19). The fourth, according to Luke (vi. 16; Acts i. 13), was father of one of the Twelve, Judas by name (not Iscariot, John xiv. 22). 1. JAMES, THE SON OF ZEBEDEE, is named only in the Synoptic Gospels and Acts, but is alluded to in the appendix to John (xxi. 2). He was a Galilean fisherman, living in and probably a native of Capernaum, who, with his younger brother John, was called by Jesus to forsake his work and become a fisher of men (Mark i. 16 et seq.), a call which elicited a ready response. His mother's name was Salome, probably a sister of Mary, the mother of Jesus. He was one of the three intimate companions of Jesus in the apostolic circle (Mark i. 29; v. 37; ix. 2; xiii. 3; xiv. 3). This intimacy with Jesus doubtless emboldened Salome to make for him and his brother the ambitious request narrated in Mark x. 35–40. Jesus called James and his brother *Boanerges* (Mark iii. 17, sons of thunder, or noise, tumult), a characterization quite in keeping with the anecdotes related by Luke (ix. 54) and Mark (x. 35 et seq.). He was put to death by Herod in 44 A.D. (Acts xii. 21). (See BOANERGES.) According to legend, he preached in Spain, and after his death his body was carried thither and buried there. During the inroads of the Saracens he appeared in shining armor and terrified the Moslem hosts. As St. Iago (Santiago), he became the patron saint of Spain. 2. JAMES, THE SON OF ALPHÆUS, was so named by the Evangelists to distinguish him from James, the son of Zebedee. He holds the first place in the third group of four in all the lists of the Twelve. Beyond this fact we have no definite information, for his name is not certainly mentioned elsewhere in the New Testament. It is possible from Mark ii. 14 that he was a brother of Levi (or Matthew), who is there called son of Alphæus. If the Clopas of John xix. 25 be taken as a translation of Alphæus, then the Mary of Mark xv. 40 may have been the wife of Alphæus, and James the Less and the James mentioned in Mark xvi. 1, Luke xxiv. 10, and Matt. xxvii. 56 this other member of the apostolic circle. 3. JAMES, THE BROTHER OF THE LORD. The facts which are explicitly stated concerning him, or which may be inferred from the statements made, are as follows: According to Paul (1 Cor. xv. 7), he saw the risen Lord; was in Jerusalem three years after Paul's conversion (Gal. i. 19, where he is called the brother of the Lord to distinguish him from the son of Zebedee); was (with Peter and John) a leader in the Church at Jerusalem when Paul, 14 years later, went up thither (Gal. ii. 1–10, where he is called simply James, for the son of Zebedee had already been put to death); was a married man (1 Cor. ix. 5). According to the Book of Acts, he was a believer (i. 14); a leading spirit in the Church at Jerusalem before (xii. 17), at (xv. 13), and after (xxi. 18) the council at Jerusalem. According to the Gospels, he was a brother of Jesus (Mark vi. 3); did not believe in the Lord during His earthly life (John vii. 5); agreed with the family of Jesus in regarding the Lord as demented and came with them to take Him away from His active work (Mark iii. 21). Josephus records his death at the instigation of the Sanhedrin (c.62–63 A.D.). Tradition names him the Just and ascribes to him the homily, in the style of the Wisdom literature, generally known as the Epistle of James (q.v.). Some scholars hold that James was not a son of Joseph and Mary, but a son of Joseph by a former wife; others that this James is the same as James the Less, a son of Mary and Alphæus (= Clopas), and that the Mary here referred to was a sister of Mary, the mother of Jesus, i.e., that James was a cousin of the Lord. (See BRETHREN OF THE LORD, THE.) 4. Of the fourth James nothing is known beyond the fact that he was not the brother of Judas, the Apostle, as stated in the Authorized Version, on the authority of the Latin text of Beza, where the Apostle Judas is confused with the Judas mentioned in the Epistle of Jude, ver. 1, as the brother of James. See JUDAS, THE LORD'S BROTHER.

JAMES, Sp. **JAYME**, or **JAÍME**, HI'mȧ, I, called THE CONQUEROR (1208–76). King of Aragon from 1213 to 1276, son and successor of Pedro II. He was born at Montpellier. On the death of his father (1213), Simon de Montfort, who had charge of James, endeavored to use this position for his own advantage; but the Pope forced him to surrender the boy. James won the surname of *El Conquistador* by wresting the Balearic Islands in 1228–32, by capturing Valencia in 1238 from the Moors, and by achieving other successes over them in Murcia during the last 20 years of his life, in behalf of his son-in-law, Alphonso the Wise of Castile. His possessions were divided between his two legitimate sons by Yolande of Hungary. He wrote his own life in Spanish; there is an English translation by Forster, *The Chronicle of James I, Written by Himself* (London, 1883). Consult also F. D. Swift, *The Life and Times of James I, the Conqueror, King of Aragon* (Oxford, 1894), and Francesch Carreras y Candi, "Espases maravelloses en lo regnat de Jaume lo Conqueridor," in *Revue Hispanique*, vol. xv (Paris, 1906).

JAMES, JAYME, or **JAÍME II**, called THE JUST (c.1260–1327). King of Aragon from 1291 to 1327, second son of Pedro III. He succeeded his father in Sicily in 1285. When he succeeded his brother, Alfonso III, in Aragon in 1291, he resigned his claim to Sicily and received in its stead Sardinia. In 1319 he promulgated a constitution by which Aragon, Catalonia, and Valencia were to be under the same laws. So much was he trusted by the people that his royal power was less limited than that of his predecessors, and in 1307 he annulled the decree requiring an annual meeting of the Cortes and replaced it by a biennial act under which the King could name the place of meeting. See ARAGON.

JAMES I OF ENGLAND AND VI OF SCOTLAND (1566–1625). He was the son of Mary, Queen of Scots, and her cousin and second husband, Henry Stuart, Lord Darnley, and was born in Edinburgh Castle June 19, 1566. The following year his mother was forced to abdicate, and he became King. There were several regents during the minority, the best of whom was the Earl of Morton, whose fall was brought about by the influence of the Duke of Lennox and that of the Earl of Arran in 1581. Meanwhile James was receiving a thorough scholastic training, especially in Latin and theology, his most famous teacher being George Buchanan. After the fall of Morton there was a series of conspiracies, a French and an English faction each seeking to control the young King. In 1582 James was seized by the Earl of Gowrie and his allies, who were adherents of England. In 1583 James escaped and joined the party hostile to the Presbyterian clergy, but after some minor difficulties an alliance with Elizabeth of England was signed in 1586. This treaty brought about a complete breach between James and his mother, whom, indeed, he had not seen since infancy. She now disinherited him in favor of Philip II of Spain, who was planning the conquest of England in the interest of Catholicism. But in 1587 she was executed in England, after James had interceded for her with Elizabeth in a half-hearted way. James's marriage to Anne of Denmark, in 1589, brought him into closer relations with the Protestants; but the King, as in everything else, cautious also in his foreign policy, maintained at the same time friendly relations with the Roman Catholic powers. In Scotland itself James had considerable trouble both with the Presbyterian clergy and the great Catholic nobles. There were several conspiracies against him, among which may be mentioned the Gowrie Conspiracy (q.v.) in 1600.

In 1603 James succeeded to the English throne as a descendant of Margaret Tudor, daughter of Henry VII, and one great object of his policy was thereby obtained. James was in favor of peace with Spain, and so he at once dismissed Sir Walter Raleigh (q.v.) from the Council and imprisoned him. He continued Robert Cecil (q.v.), the Minister of Elizabeth, in power, and as a result the old fines continued to be imposed on the Catholics, and the difficulties with them resulted in 1605 in the Gunpowder Plot (q.v.). Moreover, the Puritans also caused trouble. James finally consented to meet their representatives; but the result was unfavorable to the Puritans, on account of the similarity of their doctrines to those of the Presbyterians, with whom James had had so much trouble in Scotland. (See HAMPTON COURT CONFERENCE.) In foreign affairs James broke with the policy of Elizabeth, deserted the Dutch, signed (1604) a treaty with Spain, and began to seek a marriage alliance for his son with its royal house. At home James provoked national prejudices by seeking to bring about the political union of England and Scotland. Though he was unsuccessful in this, he obtained a judicial decision in 1608 whereby Scotchmen born after James's accession to the English throne, the so-called "post-nati," were subjects of the King of England. James believed himself independent of all control, but in reality was continually ruled by favorites. In 1607 a Scotchman named Robert Carr (q.v.) obtained control over James, and in 1616 he gave way to another favorite, George Villiers (q.v.).

With the outbreak of the religious wars in Germany, foreign affairs became all-absorbent. In the Cleves-Jülich troubles in 1609 James had allied himself for a short time with the Dutch, and in 1613 his daughter, Elizabeth, had married the Elector Palatine, the head of the Protestant Union of Germany. In 1617, however, James vigorously reopened negotiations for a Spanish marriage, and as a result the election of his son-in-law, the Elector Palatine, as King Frederick V of Bohemia in 1619, which marked the outbreak of the Thirty Years' War, was extremely annoying to him. The English nation desired to aid Frederick, but James refused to support the Protestants on the Continent. When the fortune of war went against Frederick, grave discontent broke out in England; and James, now that it was too late, sent some slight assistance. Meanwhile the negotiations with Spain went on. In 1623 Charles, who was Prince of Wales since the death of Prince Henry in 1619, together with Villiers, created in 1624 Duke of Buckingham, went to Spain to prosecute the suit. Buckingham, however, quarreled with the leading men of the Spanish court, the negotiations resulted in a war with Spain, and a marriage alliance was signed instead with France. James died on March 27, 1625. James was known as one of the best scholars of his time, though in him scholarship often assumed the form of ridiculous pedantry. The Authorized Version of the Bible was completed between 1604 and 1611, and the work was encouraged by the King. His vacillating policy and complete subserviency to the will of his favorites caused him to be regarded with contempt, and he was pithily described by the great French statesman Sully as the "wisest fool in Christendom." He believed fully in the divine right of kings and desired an absolute monarchy, but did not know how to manage his parliaments and was compelled to dissolve them on several occasions. Moreover, the House of Commons impeached his ministers, a notable case being that of his great Chancellor, Francis Bacon (q.v.). In Scotland the reign of James was fairly successful, for he understood the temper and spirit of that country better than that of England. The reign of James is also notable for the beginning of permanent English colonization in America and some unsuccessful expeditions, as that of Sir Walter Raleigh to the mouth of the Orinoco in 1616. See *History*, under UNITED STATES.

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JAMES II OF ENGLAND AND VII OF SCOTLAND (1633–1701). The son of Charles I and Henrietta Maria, he was born Oct. 14, 1633. While a mere infant, he was created Duke of York and Albany. In 1646 he was surrendered along with his father to the Parliamentary authorities, who held him in custody till he managed to escape to Holland in 1648. He served in several campaigns under Turenne; but as the treaty between Cromwell and Louis XIV provided for the removal of the English royal family from France, James entered the military service of Spain. Appointed Lord High Admiral of England at the Restoration, he twice commanded the English fleet in the ensuing wars with Holland. Although he showed some ability in this office, his weak, inconsistent character stood in the way of much-needed naval reform. On the death of his wife Anne—daughter of Sir Edward Hyde—as an avowed Catholic, he declared himself a convert to her faith. The Test Act of 1673 accordingly compelled him to resign his office. His marriage in this year with Mary

Beatrice, sister of the Duke of Modena, led him to favor close connection with Louis XIV. When great irritation against the Roman Catholics arose in England on the publication of Titus Oates's supposed discoveries, the Duke of York retired for a short time to Holland. The bill for his exclusion from the throne was twice read before the House of Commons and prevented from passing only by the prorogation of Parliament, May 26, 1679. In 1680 the Exclusion Bill passed the House of Commons, but was rejected by the Lords. On his return from abroad, and while this bill was before Parliament, the Duke was sent to govern Scotland. But when Charles II died (Feb. 6, 1685), James succeeded to the crown without opposition. At the beginning of his reign he incurred the hostility of Parliament by favoring Catholics, but, like his brother, Charles II, sought to become somewhat independent of Parliament by allowing himself to be a pensioner of Louis XIV. In Passion Week, 1685, the rites of the Church of Rome were openly celebrated at Westminster with full splendor. In the same year the suppression of the Duke of Monmouth's rebellion in England, and that of the Earl of Argyll in Scotland, was followed by great severities. On the western circuit alone, well known as the Bloody Assize, presided over by the infamous Jeffreys, 320 persons were hanged. When Parliament met (November 9) James requested extra supplies to maintain a standing army; but after a stormy debate he was refused. To aid his endeavors in favor of the Roman Catholics, he resolved to conciliate the Puritans, much as he hated them. On April 4, 1687, appeared the memorable Declaration of Indulgence, in which he announced his intention of protecting dissenters in the free exercise of their religion; and the nation beheld the extraordinary spectacle of the house of Stuart leagued with republican and regicide sects against the old Cavaliers of England. The attempt to conciliate the Puritans, however, was unsuccessful; and in March, 1687, it began to be evident that the war between King and church must soon reach a climax. At that time, a vacancy having occurred in the presidency of Magdalen College, Oxford, a royal letter recommended Anthony Farmer, a Roman Catholic, to the vacant place. For Farmer was afterward substituted Parker, a Bishop of Oxford, who, in addition to other legal disqualifications, was known to be a Roman Catholic, though not avowed. To place him in the office the King resorted to military force. On April 27, 1688, James published a second Declaration of Indulgence, which he ordered to be read in all the churches in the Kingdom. The clergy generally disobeyed, and seven of the bishops, for venturing on a written remonstrance, were committed to the Tower on a charge of seditious libel. On June 10 of the same year James's luckless son, known in history as the Pretender, was born. The certainty that the young heir to the throne would be trained in the Roman Catholic faith determined the country to be rid of the King. Public sentiment compelled the court to acquit the seven bishops, June 30, 1688. That very night an invitation was dispatched to William, Prince of Orange, signed by seven of the leading English politicians, to bring an army into England for the restoration of liberty and for the support of Protestantism. On November 5 William landed at Torbay with 14,000 men. James found himself deserted by the nobility, gentry, and army; even his own children turned against him. He retired to France, where he was hospitably received by Louis XIV, who settled a revenue upon him. Early in March of the following year he made a hopeless attempt to regain his throne by invading Ireland with a small army, with which he had been furnished by the King of France. He waged war on the island for more than a year, but was finally defeated at the battle of the Boyne, July, 1690. Returning to France, he continued to reside at Saint-Germain till his death, Sept. 6, 1701. During the greater part of his life he was as licentious as others of his rank, but in his last years of retirement he became a religious ascetic.

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JAMES I (1394–1437). King of Scotland from 1406 to 1437. He was the third son of Robert III and in 1402 became heir to the throne on the death of his elder brother, the Duke of Rothesay, supposed to have been murdered at the instigation of his uncle, the Duke of Albany. In 1404 or 1406, while on his way to France, the vessel in which he embarked was taken by the English, and James was carried to London and sent to the Tower. He was well treated, but held a prisoner for 18 or 19 years. In 1420 he accompanied Henry V in his expedition to France. On the death of Robert III, in 1406, the government devolved on the Duke of Albany, and on his death, in 1420, his son Murdoch succeeded to the regency. In 1424, James was allowed to return to Scotland on giving hostages for the payment of his ransom, which had been fixed at 60,000 marks (£40,000), but 10,000 marks were deducted because previous to leaving England he married Jane, daughter of the Earl of Somerset, a son of John of Gaunt. To the excellent education which he had received in England James probably was indebted for the development of his very considerable powers of mind. He was the author of *Kingis Quair* (i.e., the King's quire or book), which shows him to have been possessed of high poetic talent. *Christ's Kirk on the Green* and other poems have been attributed to him, but the authorship is disputed. With the acts of his first Parliament, in 1424, the regular series of Scottish statutes begins. Many excellent laws were passed for the regulation of trade and for the internal economy of the Kingdom, while these were followed up by an executive vigor which Scotland had never known before. No sooner did James feel himself firmly seated on the throne than he resolved to execute vengeance on the Albany family. By a Parliament held at Perth in 1425, the late Regent Murdoch, the Earl of Lennox, and other nobles of their family were found guilty of certain crimes laid to their charge, and four of them were beheaded. The next few years of James's reign are among the most really peaceful in the history of Scotland previous to the union of its crown with that of England; the efforts of the King being entirely directed to the repression of the internal disorders of the Kingdom, especially of the Highlands, where scarcely any law except that of the strongest had hitherto been known. In 1436 James's eldest daughter, Margaret, was married to the Dauphin of France, afterward Louis XI. Among those whom the severe policy of the King had offended was Sir Robert Graham, who had been banished in 1435 and had suffered the loss of his estate. On Feb. 20, 1437, at Perth, the royal chamber was invaded by a band of armed men headed by Graham, and the King was dragged from his hiding place and put to death. James was unquestionably the most able of the Stuart family. Both his intellectual and his practical abilities were of a very high order. His works have been edited by Skeat for the Scottish Text Society (Edinburgh, 1884). Consult Andrew Lang, *History of Scotland from the Roman Occupation*, vol. i (New York, 1900).

JAMES II (1430–60). King of Scotland from 1437 to 1460. He was the son of James I and was crowned at Holyrood in the seventh year of his age. Sir William Crichton, the Chancellor, and Sir Alexander Livingstone competed to get possession of the person of the young King and consequently to wield the royal authority. The power of the house of Douglas was so great as almost to overshadow that of the crown. In the hope of curbing it Crichton had treacherously caused William, the young Earl of Douglas, and his brother to be put to death. The policy of the act proved to be as bad as its spirit, for by the marriage of the heiress of the murdered youth with her cousin the family was restored to more than its former power. The young King, weary of the rule of Crichton, put himself under the control of another Earl of Douglas. Under the rule of the Earl the Kingdom fell into complete anarchy and became a scene of violence and disorder. In 1449 James married Mary of Gelderland and began his real rule. Like most of the Stuarts, he possessed great animal courage; he seems also to have possessed much of his father's clearness of perception in framing laws and of his energy in enforcing their observation. Chafing at the power of Douglas, James treacherously murdered him in Stirling Castle (1452), and Douglas's brother, after a vain resistance, fled. In 1460 James infringed an existing truce with England by laying siege to the castle of Roxburgh, then in the hands of the English. On August 3 he was killed by the bursting of a cannon. Consult Andrew Lang, *History of Scotland from the Roman Occupation*, vol. i (New York, 1900).

JAMES III (1451–88). King of Scotland from 1460 to 1488. He was the son of James II and Mary of Gelderland. On the death of his father the government appears to have been conducted by his mother, who was under the influence of Archbishop Kennedy. On the death of the latter, in 1466, the young King fell under the control of Lord Boyd and his family. In 1467 they had acquired influence so great that James gave his sister in marriage to Sir Thomas Boyd, son of Lord Robert, Sir Thomas being at the same time created Earl of Arran. Before the King's marriage, however, in 1469, with Margaret of Denmark, power changed hands; Lord Boyd was obliged to flee, and even Arran was driven into exile. Soon after this James seems to have fallen under the influence of favorites. Conspicuous among these was a man named Cochrane, an architect. Through his wiles the Duke of Albany, brother of James, was forced to flee from the Kingdom, having been charged with witchcraft; while the Earl of Mar, also a brother of the King, was imprisoned on the same accusation and probably put to death. The banished Duke of Albany raised an army and invaded Scotland in 1482; a short-lived peace followed, and Albany died in exile in 1485. In 1487 Margaret of Denmark died. James's love of pursuits which for the age in which he lived were intellectual brought upon him the contempt of a warlike and barbarous nobility, on which the weakness of his moral character imposed no check. A conspiracy, the origin of which is obscure, ended in a rebellion having for its avowed object the dethronement of the King. Many of the peers, however, remained loyal, so that James was enabled to put himself at the head of a considerable force. But, mainly through the cowardice of the King, the royal army was defeated at Sauchieburn, June 11, 1488. James escaped from the field, but he was afterward discovered by one of the rebels and murdered. Boece's *Chronicle* is the fullest account. Consult Andrew Lang, *History of Scotlahd from the Roman Occupation*, vol. i (New York, 1900).

JAMES IV (1473–1513). King of Scotland from 1488 to 1513. The son of James III and Margaret of Denmark, he was born March 17, 1473. He was made the nominal leader of the rebel army by which his father was slain, and although but a youth at his accession he took from the first an active part in public affairs and aided personally in suppressing the rebellion headed by the Earl of Lennox. He won great popularity by his interest in the common people, and throughout his reign he labored to develop commerce and to build up a navy. In 1503 he married Margaret, daughter of Henry VII of England, and made a treaty with his father-in-law which secured peace between the two countries for a few years. Meantime James was passing laws for the better administration of criminal justice, for the annual election of magistrates, for confirming the privileges of the burghs, for the discouragement of beggars, and for the daily session of the council at Edinburgh. This city was now becoming the capital of the Kingdom. Not only is his reign important in the history of Scottish law, but he showed skillful diplomacy in securing friendly relations with the continental powers. From the accession of Henry VIII, however, trouble again arose between England and Scotland. In 1513 the English Parliament declared war against both Scotland and France. The Scottish King, who had long been making preparations, marched with a large, well-equipped army to meet Surrey, the English commander, at Flodden. It was a "black day" for Scotland; she lost perhaps 10,000 men, a great number of nobles, and her King, who fell fighting in the ranks (Sept. 9, 1513). Though great in the history of Scottish civilization, he was an incompetent general, and the defeat was due chiefly to him. Not till after her union with England did his country recover from the loss. His fickle wavering between France and England also caused Scotland much trouble. James V, his only legitimate child, succeeded him. Consult: *Treasurer's Accounts, Exchequer Rolls*, and *Acts of Parliament* of his reign; Teulet, *Papiers d'état, pièces et documents inédits ou peu connus, relatifs à l'histoire de l'Ecosse au XVIème siècle, tirés des bibliothèques et des archives de France* (Paris, 1851-60); J. H. Burton, *History of Scotland* (8 vols., London, 1873); Brown, *History of Scotland*, vol. i (Cambridge, 1899); Andrew Lang, *History of Scotland from the Roman Occupation* (4 vols., New York, 1900-07).

JAMES V (1512-42). King of Scotland from 1513 to 1542. The son of James IV and Margaret of England, he was born April 10, 1512. The period of his long minority is one of the gloomiest in Scottish history. Such was the lawless state of the country that it was impossible to travel safely except in armed companies. The Duke of Albany, representing the interests of France, was chosen Regent by Parliament, but his government was almost powerless, owing chiefly to the jealousy and enmity of the Earl of Angus, who was friendly to England and had married the Queen mother. Ultimately Angus prevailed, and the Duke retired to France. For a while the Angus branch of the Douglas family ruled Scotland in the same manner as the elder branch had ruled it in the beginning of the reign of James II. In his seventeenth year the King, resolving no longer to brook the authority of the Earl, escaped from his custody. Angus and his family were banished, and their estates declared forfeited. In 1536 James visited the court of France, and next year married Madeleine, daughter of Francis I. She lived but a few weeks. Soon after her death the King married Mary of Lorraine, daughter of the Duke of Guise. Henry VIII, after declaring his independence of the Pope, wished his nephew to support him in the movement; but James remained true to his ancestral faith and strengthened the laws against heresy. Far from coming to an agreement on the subject of religion, the two Kings went to war against each other. In 1542 the English, while making an incursion across the border, were attacked and defeated with great loss by the Earl of Huntly and Home. To avenge this disaster, Henry sent the Duke of Norfolk into Scotland with an army of 20,000 men, who, however, retired on the approach of James with a superior force. The Scottish King desired thereupon to invade England, but the nobles would not follow him. There had long been strife between the crown and the nobility, but the breach was widening with the progress of the Reformation; for while the Lords adopted the new ideas, the King clung to the Church. He antagonized the nobles further by championing the Commons against them. Finally, Lord Maxwell and a few other western nobles consented to lead an army of 10,000 men across the border, but they were enraged at seeing Sinclair, the King's favorite, set over them as commander. In the disorder which followed this appointment the army was disgracefully beaten by a few hundred Englishmen. This dishonor to his arms seems to have broken the heart of James and to have affected his mind. He shut himself up in Falkland Palace, where he died, Dec. 14, 1542, a few days after the birth of his unfortunate daughter Mary. He was a protector of the poor and an excellent administrator, who made his power felt for good throughout Scotland; at the same time he was avaricious and licentious and unable to bear up against misfortune. Consult the bibliography for the preceding subject, and, in addition, for relations with the Pope: Theiner, *Vetera Monumenta Hibernorum et Scotorum Historiam Illustrantia, 1216-1547* (Rome, 1864); J. A. Froude, *History of England* (12 vols., New York, 1874).

JAMES VI OF SCOTLAND. See JAMES I OF ENGLAND AND VI OF SCOTLAND.

JAMES VII OF SCOTLAND. See JAMES II OF ENGLAND AND VII OF SCOTLAND.

JAMES, CHARLES (?-1821). An English soldier and author. He is remembered chiefly for his eyewitness account of the opening scenes of the French Revolution published under the title *Audi Alteram Partem* (1793), wherein he extenuates the conduct of the revolutionists. His other writings diverge widely, from *Petrarch to Laura: A Poetical Epistle* (1787) and *Poems* (2 vols., 1789) to *Hints Founded on Facts, or a View of our Several Military Establishments* (1791) and several other publications on military subjects.

JAMES, DANIEL WILLIS (1832-1907). An American merchant and philanthropist, born in Liverpool, England. In his youth he entered the employ of Phelps, Dodge & Co. in New York City. He became chiefly known for his benefactions, although he gave without ostentation and often anonymously. To Union Theological Seminary he gave $1,000,000 for the erection of new buildings on Morningside Heights in New York City, and during his lifetime he gave large sums also to Amherst and Oberlin colleges, Hartford Theological Seminary, Columbia University, and the Cathedral of St. John the Divine. By his will he left legacies of $100,000 each to Union Theological Seminary, Columbia and Yale universities, Amherst College, Cooper Union, the Children's Aid Society of New York, the American Board of Commissioners for Foreign Missions, Hampton Institute, the Cathedral of St. John the Divine, and the Presbyterian Hospital of New York. He presented to the town of Madison, N. J., a public park, a library, and an assembly hall.

JAMES, EDMUND JANES (1855-). An American political economist and university president, born at Jacksonville, Ill. He was educated at Northwestern and Harvard universities and at Halle, where he received the degrees of A.M. and Ph.D. in 1877. For several years he was principal of high schools at Evanston and Normal, Ill. From 1883 to 1895 he was professor of public finance and administration in the Wharton School of Finance and Economy, University of Pennsylvania, at the same time holding the chair of political and social science in the university. For five years (1896-1901) he was professor of public administration and director of the extension division at the University of Chicago. In 1902 he became president of Northwestern University, and in 1904 president of the University of Illinois. He served as president of the American Economic Association; was a founder, and from 1889 to 1901 president, of the American Academy of Political and Social Science (editor of its *Annals*, 1890–95; associate editor, 1895–98); and from 1891 to 1895 was president of the American Society for the Extension of University Teaching. Among his writings are: *Outline of a Proposed School of Political and Social Science* (1885); *Relation of the Modern Municipality to the Gas Supply* (1886); *The Legal Tender Decisions* (1887); *The Federal Constitution of Germany* (1890); *The Federal Constitution of Switzerland* (1890); *The Education of Business Men in Europe* (1899); *Growth of Great Cities* (1900); *Government of a Typical German City—Halle* (1900); also a large number of papers in transactions of societies. While at the University of Pennsylvania, he edited its Political Economy and Public Law Series of Publications (1886–95).

JAMES, Epistle of. The first of the so-called catholic Epistles of the New Testament. After the signature, address, and greeting (i. 1), the writer at once exhorts his readers to a proper endurance of "trials" (Gk. *πειρασμοί*, testings) and to a proper attitude towards "temptations" (same Gk. word), noting that the latter are not sent of God, but arise from human inclinations (i. 2–18). Next he points out that not only hearing, but doing the word is necessary (i. 19–27), after which comes a trenchant rebuke of the tendency to curry the favor of the rich and neglect the poor (ii. 1–13). This leads to a discussion of the relation between faith (i.e., formal assent to religious truth) and works, showing that faith must exhibit itself in deeds (ii. 14–25). Those eager to become teachers are reminded that it is in word or speech that one is most liable to fail or offend, and the tongue needs strong curbing (iii. 1–12). True wisdom shows itself in good conduct, especially peaceableness (iii. 13–18). He next admonishes against strife and quarrelsomeness (iv. 1–10), against backbiting and judging (iv. 11–12), to proper recognition of Providence (iv. 13–17), that the haughty rich be more considerate of the poor (v. 1–6), to patient waiting and endurance until the reward comes at the Parousia (v. 7–11), against swearing (v. 12), and finally to prayer and labor for the conversion of others (v. 13–20).

This epistle, or homily, is either one of the very earliest or one of the latest of the New Testament writings, and the solution of the problem of its date rests upon the determination of three questions, each of them interesting in itself, and all of them subject to debate among scholars to-day. 1. Is the writer of the Epistle the well-known James, the brother of the Lord, the head of the Jerusalem Church, or an unknown James of postapostolic times? 2. Were the recipients of the letter distinctively Jewish Christians, or Christians generally, Gentile as well as Jewish? 3. Does the situation of the readers betray the primitive condition of the Church before the Judaizing controversy of Acts xv, or the developed condition of the Church after that controversy had been forgotten? As to the first question, it would seem that the naïve way in which the author describes himself ("James, a servant of God and of the Lord Jesus Christ," i. 1) could be better understood of one who, like the Jerusalem James, was conscious of his recognized authority in the Church (cf. Gal. ii. 9, 12; Acts xv. 13; xxi. 18), and so needed no further titles to commend himself to those to whom he wrote, than of an unknown James who, if he followed the custom of the second century, must have made his message depend upon such titles as he could either honestly or falsely assume. There is naturally the query whether we can suppose the culture evident in the language and diction of the Epistle possible in the case of a Palestinian Jew, as the brother of the Lord must have been; but conclusions here are wholly conjectural and must yield to more definite indications furnished by other points. As to the second question, the wording of the address ("James . . . to the twelve tribes which are of the Dispersion, greeting," i. 1) makes apparently clear the distinctively Jewish character of the readers —an impression which seems to be confirmed by several hints throughout the letter (e.g., ii. 2, 19, 21; v. 4, 11, 17, 18). At the same time we cannot ignore the fact that terms similar to the address are used symbolically, both by Paul (Gal. vi. 16; Phil. iii. 3) and by Peter (1 Pet. i. 1; ii. 9); while the phrases referred to in the body of the letter might be possible with a Gentile readership (cf. Rom. iv. 1, ix. 29; 1 Cor. viii. 6). The third question is really the decisive one; since, if the situation shows itself necessarily that of primitive Christianity, the readers must be considered distinctively Jewish Christian, and the author becomes almost necessarily the Jerusalem James; while, if the situation is that of postapostolic Christianity, the readers cannot be exclusively Jewish, since a group of such churches in the Diaspora is scarcely supposable so long after Gentilism had become part of Christendom. Much less, on the supposition of such a later date, can the author have been the Jerusalem James.

The situation disclosed by the Epistle, however, is clearly that of early Christianity, while the Church was yet almost exclusively Jewish, and before the introduction of Gentiles into its membership had brought about the Judaistic controversy, considered in the Jerusalem Council (Acts xv) and discussed by Paul specifically in his Galatian Epistle. This is shown (1) not so much by the social customs of ii. 1–9 and community conditions of v. 1–6, the commercial life of iv. 13, the term given to their religious assemblies in ii. 2, and the oath formula described in v. 12, all of which indeed disclose a definite situation belonging to the readers that cannot be naturally understood save as Jewish; but rather (2) by the fact that there is such an absence of all reference to Gentile and Jewish differences in the Church as has its only legitimate explanation in the fact that the gospel had not yet been carried outside of Jewish circles to such an extent as to raise the questions which constituted the controversy of Acts xv; and, specifically, (3) by the fact that not only is the faith and works discussion of ii. 14–25 not a polemic against Paul, but it is not even a sympathetic explanation of his position. It belongs distinctively to a period previous to the Pauline propaganda, as is clear from the fact that the idea of "justification" which it embodies is specifically the Old Testament idea of the justification of the just, not the Pauline idea of the justification of the sinner; while its idea of "faith" is distinctively the idea seen in the Old Testament of intellectual belief in monotheism, not the Pauline idea of spiritual trust in Jesus Christ. Against this uniquely Jewish conception of things it is of little moment to emphasize the moral degeneracy of the times supposed in the Epistle as impossible in the early years of Christianity. As such degeneracy was actual in Judaism itself (cf. Rom. ii. 17–29), the question is simply one of the possibility of the reaction of Jewish Christianity into its previous condition, and it is altogether too bold a claim to make that the 17 years between Pentecost and the Jerusalem Council were too short a period for this. 4. The absence of the conventional Christian terminology common to the Christian writings of the latter part of the first and the early part of the second centuries is also decisively in favor of an early date for this Epistle. The Epistle is, therefore, to be dated some time before 50 A.D., from somewhere in Palestine—most likely Jerusalem, by James, the head of the mother Church. It was addressed as an encyclical letter to the near-by Jewish Christian communities—probably those in the Syrian regions to the north, which were quite likely those first evangelized after the Stephen persecution (cf. Acts viii. 1, 4, 40; ix. 1, 2, 19–25; xi. 19). Its purpose was to encourage the readers in face of their peculiar trials, which were easily possible in the time succeeding the above persecution, and at the same time to warn them against their special degenerating tendencies, which were quite likely to follow upon these trials (cf. especially chaps. i and ii).

Bibliography. A full survey of the literature on James will be found in James Moffatt, *Introduction to the Literature of the New Testament* (New York, 1911), who states the case fairly for the late date and authorship by some unknown writer. The counter position is ably stated by Theodor Zahn in his *Introduction to the New Testament* (Edinburgh, 1909); and by J. B. Mayor in his *Epistle of St. James* (3d ed., London, 1910).

JAMES, GEORGE PAYNE RAINSFORD (1799–1860). An English novelist and historical writer, born in London, Aug. 9, 1799. He attended a school at Putney, where he acquired some knowledge of French and Italian, and subsequently educated himself by wide reading and extensive travel on the Continent. After he had won a place among the contemporary novelists, he was appointed Historiographer Royal under William IV and, later in life, Consul at Boston, at Norfolk, Va., and finally (Consul General) at Venice, where he died May 9, 1860. He began his literary career by writing Eastern tales, which were praised by Washington Irving. In 1829 he published *Richelieu*, an historical novel somewhat in the manner of Scott. Thereafter volume followed volume—and his novels were for the most part historical—in rapid succession, until the number of novels and tales reached almost 100. The best of them is, perhaps, *Mary of Burgundy*. He also wrote, or rather dictated, many biographies and histories, among which are *Memoirs of Great Commanders* (1832), *A History of Chivalry* (1843), and *Life of Richard I* (4 vols., 1842–49). Following the example of Scott, he collected his novels with elaborate prefaces (1844–49). Some of them are still obtainable in cheap editions. While in the United States, he wrote in connection with M. B. Field *Adrian, or the Clouds of the Mind* (1852). James was immensely popular in his own time, but his conventional moralizing and descriptions have long been out of date. His novels are all constructed on the same mechanical plan. They open with two horsemen riding through lovely scenes, or with an invocation to them before they appear, or with the variant of two men talking in subdued tones over their cups. Consult *Works* (new ed., New York, 1903), and A. H. Joline's consideration of James, in his *At the Library Table* (Boston, 1910). A burlesque of the style of G. P. R. James was written by Thackeray under the title of "Barbazure," in his *Novels by Eminent Hands* and first printed in *Punch* (London, 1847); also in Centenary Biographical Edition, vol. i (ib., 1911).

JAMES, GEORGE WHARTON (1858–). An American explorer, ethnologist, and archæologist, born at Gainsborough, Lincolnshire, England. He spent many years in exploration in the Southwest of the United States, especially along the Grand Cañon of the Colorado River, and at the same time made extensive researches among the various Indian tribes of those regions. He became a popular lecturer on these subjects, using pictures made by himself. He was associate editor of the *Craftsman* (1904–05) and editor of the *Basket* (1903–04) and *Out West* (1912–). He is author of *In and Around the Grand Canyon* (1900; rev. ed., 1911); *Indian Basketry* (1900; 3d ed., 1903); *The Indians of the Painted Desert Region* (1903); *In and Out of the Old Missions* (1905); *The Story of Scraggles* (1906); *The Wonders of the Colorado Desert* (1906; 2d ed., 1911); *What the White Race may Learn from the Indian* (1907); *Through Ramona's Country* (1908); *The Grand Canyon of Arizona* (1910; rev. ed., 1912); *The Heroes of California* (1910); *A Little Journey to Strange Places and Peoples* (1911); *The Old Franciscan Missions of California* (1913); *The Prehistoric Cliff Dwellings of the South West* (1913); *California, Romantic and Beautiful* (1914); *Indian Blankets and their Makers* (1914).

JAMES, SIR HENRY (1803–77). An English topographer, born at Rose-in-Vale, near St. Agnes, Cornwall, and educated at the Woolwich Military Academy. He became a probationer for the Corps of Royal Engineers in 1825, in 1826 was made lieutenant of engineers, and went thence into the ordnance department, where he made such good use of his opportunities for scientific study that he was appointed superintendent of the geological survey in Ireland in 1844. Two years later he was appointed to a position at the Portsmouth dockyards, was afterward made chief topographer and statistician of the War Office (1857), and was at the head of the British Ordnance Survey from 1852 to 1875. He published such technical works as *Principal Triangulations of the Earth* (2 vols., 1858), *Abstract of the Principal Lines of Spirit-Levelling in England and Wales* (1861), and *Plans and Photographs of Stonehenge and of Turnsachen in the Island of Lewis*, with *Notes Relating to the Druids, and Sketches of Cromlechs in Ireland* (1867). He is credited with having invented photozincography.

JAMES, HENRY (1811–82). An American Swedenborgian theologian, lecturer, and author, father of William (1842–1910) and Henry (1843–) James. He was born in Albany, N. Y., graduated at Union College in 1830, studied at Princeton Theological Seminary until

1835, and then traveled abroad, where he met Sandeman, whose *Letters on Theron and Aspasia* he edited in 1839. James's earlier theological views are Unitarian, though he believed in the divinity of Christ. Later he was greatly influenced by Swedenborg, whose doctrines he accepted, but whose ecclesiastical system he combated. He lectured in New York in 1849 and 1852 and published: *Lectures and Miscellanies* (1852); *The Church of Christ not an Ecclesiasticism* (1854); *Christianity the Logic of Creation* (1857); *The Secret of Swedenborg* (1869). His *Literary Remains* were edited by his son William James in 1885.

JAMES, HENRY (1843-). A distinguished American novelist and essayist, born in New York City, April 15, 1843, the son of the eminent theologian, Henry James, and the younger brother of William James, the psychologist. He was educated privately in New York, in Switzerland, in England, and in France, and in 1862 he entered the Harvard Law School. He preferred, however, the lectures of James Russell Lowell to the regular work of his courses. After one or two short stories of his had been published, he turned his attention definitely to literature. His contributions to periodicals began as early as 1866. Between 1871 and 1903 he produced more than 40 books, some of them books of essays, but the major part of them works of fiction. Even his early work showed him a resourceful master of language; his style at first was simple, supple, and natural, and the movement of his stories was steady, though not rapid. The substance of his plots was the development of character rather than dramatic incident. The persons whom he chose to portray were selected from the classes that are subject to subtle impressions, and the evanescent emotions of such characters are expressed accurately in Mr. James's work. In his early books, e.g., *Roderick Hudson* (1876), *The American* (1877), *Daisy Miller* (1879), and *The Portrait of a Lady* (1881), he chose as subject the contrast between the vigorous and kindly but simple Americans abroad and the polished arrogance of the members of older races with whom they came in contact. In fact, after 1869 Henry James himself lived abroad, traveling on the Continent and maintaining residences in London and at Rye, Sussex. His popularity increased with *The Bostonians* (1886) and *The Princess Casamassima* (1886), in both of which the subtlety of Mr. James's exposition of character was apparent. In later works, with increased insight into the complexities of the individual and of society and in the effort to render these complexities, there came a development of complexity in the style of the author, exemplified, e.g., in *The Sacred Fount* (1901), which illustrates also a tendency of Mr. James's to turn plot and action into a standing pool of analysis and mystification. In his later works the theme also has changed; the author apparently became interested in the rapid trend towards unconventionality which took place in the last part of the nineteenth century in London, and many of his books dealt with phases of that change. Perhaps the most striking examples of his works which deal with subjects that, treated in a less delicate manner, would be too brutal to seem appropriate for discussion in literature, are *What Maisie Knew* and *The Wings of a Dove;* but the exposition of the rapid change in manners and customs in London is treated most comprehensively in *The Awkward Age* (1899). He visited the United States in 1905 and published his impressions in *The American Scene* (1906), in which book the author's later style, with what appears to be its perverse obscurity, its incredibly involved syntax, and its tortured diction, reach an amazing and fantastic climax.

Mr. James found his opportunity in the richer and more complex American society which developed after the Civil War; it was this phase of the expanding national life that became the material of much of his fiction, and he chose to present it against an English or continental background and with continual contrasts of American manners, ideals, and types of character with ideals and types that were foreign or cosmopolitan. He became, in fact, the greatest practitioner of the international novel, and as such performed an immense service in bringing the world at large to a better understanding of, and a fuller sympathy with, his compatriots. He performed no less a service in the introduction of his American readers to English aristocratic life, with its prejudices and conventions, and to many phases of continental life, both of which, in their outer aspects and inner spirit, are reflected in his stories with scrupulous fidelity to truth. In making such international studies, Henry James was doing in his day for his countrymen such work as Washington Irving did in a preceding generation with his English and other foreign sketches, or as Longfellow did with his *Outre Mer* and *Hyperion* and in a different way with a not inconsiderable portion of his poetry. In his practice of the realistic method James was strikingly original. It was under the shadow of the prestige of Thackeray, Dickens, and Trollope that he began his work, but he preserved free from outside influence the integrity of his art as he personally conceived it. So distinctive was he in method and manner, so far-reaching in his influence, that he may well be called the inventor of the artistic society novel, the novel that is characterized by minute and faithful observation, refinement and intellectual delicacy, elaborate analysis, subtlety of suggestion, and free form. To Henry James's novels America owes a great debt: they have quickened her vision for beauty in art and nature, they have broadened her social horizons, and they have done much to bring Americans to a better understanding of themselves and of Europe. Mr. James became a member of the American Academy of Arts and Letters. Among his works are: *Watch and Ward* (1871); *Roderick Hudson* (1876); *Transatlantic Sketches* (1875); *A Passionate Pilgrim* (1875); *The American* (1877); *Daisy Miller* (1879); *The Europeans* (1879); *French Poets and Novelists* (1878), a work in which the author's sure taste, subtle insight, and critical discrimination are in evidence; *An International Episode* (1879); *Life of Hawthorne* (1880); *A Bundle of Letters* (1879), in which will be found excellent examples of Mr. James's art in the short story; *Confidence* (1880); *Washington Square* (1881); *The Portrait of a Lady* (1881); *The Siege of London* (1883); *The Point of View* (1883); *Portraits of Places* (1884); *A Little Tour in France* (1885); *Tales of Three Cities* (1884); *The Author of Beltraffio* (1885); *The Bostonians* (1886); *The Princess Casamassima* (1886); *Partial Portraits* (1888); *The Aspern Papers* (1888); *The Reverberator* (1888); *A London Life* (1889); *The Tragic Muse* (1890);

The Pupil (1891); *Terminations* (1895); *The Other House* (1896); *Spoils of Poynton* (1897); *Embarrassments* (1896); *What Maisie Knew* (1897); *The Two Magics* (1898); *In the Cage* (1898); *The Awkward Age* (1899); *The Soft Side* (1900); *The Sacred Fount* (1901); *The Wings of a Dove* (1902); *The Better Sort* (1903); *The Golden Bowl* (1904); *English Hours* (1905); *The Question of our Speech; The Lesson of Balzac* (1905); *Julia Bride* (1909); *The Finer Grain* (1910); *The Outcry* (1911); *Notes on Novelists, with Some Other Notes* (1914); the two autobiographical volumes, *A Small Boy and Others* (1913); *Notes of a Son and Brother* (1914). In 1900 a new and revised edition of his novels was published in New York in 24 volumes. Consult E. L. Carey, *The Novels of Henry James* (New York, 1905); Le Roy Phillips, *Bibliography of the Writings of Henry James* (Boston, 1906); W. C. Brownell, *American Prose Masters* (New York, 1909); F. M. Hueffer, *Henry James: A Critical Study* (London, 1913).

JAMES, HENRY JAMES, first BARON (1828–1911). An English jurist, born at Hereford. He was educated at Cheltenham College, studied law, was called to the bar in 1852, and met with much success in the Mayor's Court of London and at Westminster. In 1867 he attained the coveted honor of post man in the Court of Exchequer, and two years afterward became queen's counsel and entered the House of Commons. In 1873 he was appointed Solicitor-General and then Attorney-General. The latter post he received again in 1880, when the Liberals were returned to power, and in it he distinguished himself by introducing and passing the reform bill known as the Corrupt Practices Act. Disagreeing with Gladstone's Irish policy, he refused the lord-chancellorship in 1886. He held the office of attorney-general to the Prince of Wales from 1892 to 1895, and in the latter year was created Baron James of Hereford and was appointed Chancellor of the Duchy of Lancaster.

JAMES, JESSE W. (1847–82). An American outlaw, born in Clay Co., Mo., where his father, Robert James, a Baptist preacher, owned a farm. The family were Southern in their sympathies during the Civil War, and as a consequence were persecuted by their Union neighbors. In order to get revenge, Jesse joined Quantrell's guerrillas and soon earned a name for reckless daring. At the conclusion of peace he surrendered, desperately wounded, and returned to his old home. In 1866, however, he was outlawed, and from that time until his death was constantly pursued by officers of the law. During these years he attained a world-wide notoriety by the crimes he committed or was charged with having committed, by his romantic adventures, and his almost invariable success. These exploits were generally bank or train robberies. Finally Governor Crittenden of Missouri offered a reward of $10,000 for his capture, dead or alive, and, tempted by this bribe, two members of his own band, Robert and Charles Ford, killed him in his home at St. Joseph, Mo. (April 3, 1882). The murderers then surrendered to the police, and presumably received the reward of their treachery. On the eighteenth of the same month both of the Fords pleaded guilty (at St. Joseph, Mo.) to the charge of having killed James (though it was generally believed that Robert fired the shot) and were sentenced to death, but were pardoned by Governor Crittenden. Frank James, Jesse's brother, surrendered in the following October; but although he was held in jail more than a year awaiting trial, he was never convicted on any charge. He spent the last 30 years of his life as a farmer and died near Excelsior Springs, Mo., Feb. 18, 1915, at the age of 74. Jesse James's son, in a biography of the outlaw, asserted that James was always anxious to surrender, provided the authorities would guarantee him protection and a fair trial. Consult: Jesse James, Jr., *Jesse James, my Father* (Independence, Mo., 1899); Edwards, *Noted Guerrillas, or the Warfare of the Border* (1877); *American Law Review*, vol. xvi (St. Louis, Mo.).

JAMES, JOHN ANGELL (1785–1859). An English Congregational minister, born at Blandford Forum, Dorsetshire. From his thirteenth till his seventeenth year he was learning the trade of his father, a linen draper, but studied for the ministry too, and was called to Carr's Lane Chapel, Birmingham (1805), where he preached most acceptably to largely increased congregations for more than 50 years. He published a great number of sermons, pastoral letters, and the like; but his best-known books are *Christian Charity* (1829), *The Anxious Enquirer after Salvation* (1843), and *The Church in Earnest* (4th ed., 1851). Consult John Campbell, *John Angell James, his History, Character, and Literary Labours* (London, 1860), and Dale, *Life and Letters* (2d ed., ib., 1861).

JAMES, LOUIS (1842–1910). An American actor, born in Tremont, Ill., Oct. 3, 1842. He made his début at Louisville in 1864. He was a member of Mrs. John Drew's company (1865–70); then of Daly's (1871–75); and subsequently appeared in support of various noted actors, including Lawrence Barrett and Joseph Jefferson, and as a star, notably with Frederick Warde, in a series of classic revivals (1892–95). Among his Shakespearean characters were Autolycus, Nick Bottom, and Cardinal Wolsey. Consult Clapp and Edgett, *Players of the Present* (Dunlap Society, New York, 1900).

JAMES, OLLIE M. (1871–). An American legislator, born in Crittenden Co., Ky. He received an academic education, studied law under his father, and was admitted to the bar in 1891. He was one of the attorneys of Governor Goebel in his contest for the governorship of Kentucky. He served as chairman of the Kentucky delegation to the Democratic National Convention in 1896, 1904, and 1908, seconded Bryan's nomination for the presidency in 1908, and was chairman of the Democratic National Convention in 1912. He was a member of the Fifty-eighth to the Sixty-second Congresses (1903–13), and in 1912 was elected United States Senator for the term 1913–19.

JAMES, PRINCE, THE OLD PRETENDER. See STUART, JAMES FRANCIS EDWARD.

JAMES, PROTEVANGELIUM OF. See APOCRYPHA.

JAMES, ROBERT (1705–76). An English physician, born in Kinvaston, Staffordshire. He graduated at St. John's College, Oxford, in 1726, was admitted an extralicentiate of the College of Physicians, London, in 1728, and in the same year was granted the degree of M.D. by Cambridge. He practiced successively in Sheffield, Lichfield, and Birmingham before establishing himself in London, where he made himself famous by the invention of a fever powder composed of lime phosphate and oxide of antimony. He was the friend of Dr. Johnson, who helped him to publish his *Medical Dictionary* (3 vols., 1743–45). James translated the works of other physicians, and his *Vindication of the Fever Powder* was published posthumously in 1778.

JAMES, THOMAS (c.1593–c.1635). An English navigator and explorer. Being an experienced seaman and a scientific navigator versed in all kinds of observations, he was appointed in 1631 by the merchants of Bristol, with the approval of the King, to command an expedition for "the discovery of the North-West Passage to the South Sea, and to proceed to Japan round the world to the westward." Luke Fox sailed on a similar quest from London on May 3, 1631, the same day that James left the Severn, in a 70-ton ship manned by a crew of 22 seamen, and entered Hudson Bay in the latter part of June or the first part of July. Sailing over to the western shore, he turned southward, and on August 29 met Fox. Five days later he named Cape Henrietta Maria after his vessel and then sailed into the bay which is named after him. Wintering on Charlton Island, at the extreme south end of Hudson Bay, where he lost four men, he returned to England in 1632. From 1633 to 1635 he commanded the *Ninth Whelp*, an armed cruiser for the protection of commerce in the Bristol Channel and the Irish Sea, which waters at that period were seriously infested by pirates. Nothing definite is known of his later career. Consult *The Strange and Dangerous Voyage of Captain Thomas James* (London, 1633) and Rundall, *Voyages toward the North-West* (Hakluyt Society, London, 1849).

JAMES, THOMAS LEMUEL (1831–). An American banker and cabinet officer, born at Utica, N. Y. He learned the printer's trade and from 1851 to 1861 owned the leading Republican paper in Madison County, to 1856 called the *Madison County Journal* and afterward the *Democrat-Republican*. Between 1854 and 1873 he was collector of canal tolls at Hamilton, customs inspector at New York, weigher, and deputy collector in charge of bonded warehouses. From 1873 to 1881, as postmaster of New York, he introduced reforms in the local mail delivery and had an important influence on the development of this branch of the service throughout the country. He was Postmaster-General for 10 months in 1881–82, and during this short time accomplished various economies and set under way the investigation of the "star route" frauds. In 1882 he became president of the Lincoln National Bank in New York, and he served as president also of the Lincoln Safe Deposit Company and as a director of the Metropolitan Life Insurance Company. In 1896 he was mayor of Tenafly, N. J.

JAMES, THOMAS POTTS (1803–82). An American botanist. He was born at Radnor, Pa., but passed the greater part of his life in Philadelphia, where he was in the wholesale drug business. In 1867 he went to live in Cambridge, Mass., and there devoted himself to botanical research, which had hitherto been his recreation. He wrote several papers for the *Proceedings of the Philadelphia Academy of Natural Sciences* and for the *Proceedings of the American Academy of Arts and Sciences;* prepared the article on "Musci," in the volume on botany of King's *Exploration of the 40th Parallel*, and with Leo Lesquereux wrote *Manual of American Mosses* (1884).

JAMES, WILLIAM (died 1827). An English naval historian. The date and place of his birth are unknown. Between 1801 and 1813 he was an attorney of the Supreme Court of the island of Jamaica and a proctor in Admiralty. At the outbreak of the War of 1812 he was in the United States and was detained as a prisoner, but escaped to Halifax in 1813. He was much interested in naval affairs and over the signature of "Boxer" wrote a number of articles on the war for the British *Naval Chronicle*. In 1816 he published a bitterly anti-American pamphlet entitled *An Enquiry into the Merits of the Principal Naval Actions between Great Britain and the United States* (enlarged under changed title, 1817). In 1818 he published *A Full and Correct Account of the Military Occurrences of the Late War between Great Britain and the United States of America*, and in 1819 he began his most important work, *The Naval History of Great Britain from the Declaration of War by France in 1793 to the Accession of George IV* (1st ed., 5 vols., 1822–24; reprinted, 6 vols., 1826; ed. in 6 vols., 1837; ed. in 1886; epitomized ed., 1 vol., by Robert O'Beirne, 1888). Accounts of all operations in which the British navy was not victorious are omitted.

James was a fierce partisan. While he carefully sought and examined all British sources of information, he gave no weight to contradictory evidence on the other side, so that his conclusions are often erroneous and very unfair. His contention that the American ships were more powerfully armed and more heavily manned than British vessels of similar rating was in many cases true, but the discrepancy was not so great or so important as he strove to make it appear. J. Fenimore Cooper's *Naval History* (1st ed., 1839) was written in part to refute James's statements; but Cooper's resentment towards Britain and friendliness to his own service led him into erring almost as far on the opposite side, and it was not until the appearance of Theodore Roosevelt's *Naval War of 1812* (1882) that a fair statement of the facts was made.

JAMES, WILLIAM (1842–1910). A distinguished American psychologist and philosopher, son of Henry James, the theologian, and brother of Henry James, the novelist. He was born in New York City, Jan. 11, 1842, was educated in private schools and by tutors in New York and Europe, studied at the Lawrence Scientific School, and graduated from Harvard Medical School in 1870. He received the honorary degree of LL.D. from Princeton, Edinburgh, and Harvard, and that of Ph. et Litt.D. from Padua. Beginning to teach at Harvard in 1872, he was appointed professor in 1881. At first his subjects were anatomy and physiology, then philosophy, later psychology, and then again philosophy. He was Ingersoll lecturer on the immortality of man, at Harvard University (1898); Gifford lecturer on natural religion, at the University of Edinburgh (1899–1901); Lowell Institute lecturer (1906); and Hibbert lecturer on the present situation in philosophy, at Manchester College, Oxford (1909). In 1908 "his colleagues at Columbia University" published in his honor *Essays Philosophical and Psychological*. Besides numerous articles in medical and scientific journals, he published: *Principles of Psychology* (1890); *Psychology, Briefer Course* (1892); *The Will to Believe, and Other Essays in Popular Philosophy* (1897); *Human Immortality: Two Supposed Objections to the Doctrine* (1898); *Talks to Teachers on Psychol-*

ogy, and to Students on Some of Life's Ideals (1899); *The Varieties of Religious Experience* (1902); *Pragmatism* (1907); *A Pluralistic Universe* (1909); *The Meaning of Truth* (1909); *Memories and Studies* (1911); *Some Problems of Philosophy* (1911); *Essays in Radical Empiricism* (1912). He also edited the *Literary Remains of Henry James* (1885).

James's writings are characterized by a fresh and entertaining style and by lucid exposition of abstruse themes. From the publication of the *Principles* until the time of his death his reputation and influence, both in America and in Europe, were probably unequaled by any other American psychologist. His work is especially significant in the field of analytical psychology, in which James has had few equals; several important theories in this field pass under his name. In philosophy his work was notable for keenness and originality. He was perhaps the foremost American expositor, and in a large measure the originator, of the doctrines included under the term "radical empiricism" (q.v.) and "pragmatism" (q.v.; see also Dewey, John). He entered upon his philosophical studies fresh from his successful work in psychology and brought with him a keen desire to give up all unnecessary theorizing and to confine himself to correct and full description. His radical empiricism was in spirit nothing but an attempt to make experience self-supporting instead of having it depend on assumed extra-experiential factors. His pragmatism was in like measure a revolt against the logic of absolute idealism, developed by Royce and Bradley, and an attempt to make logic a description of our actual thinking processes. His influence was enormous even in those philosophical circles most remote from his own.

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JAMES BAY. The southern arm of Hudson Bay (q.v.) (Map: America, North, K 4). It is 300 miles long from north to south and 160 miles wide and contains a number of islands, the largest of which, Agomska, is 70 miles long. The bay is shallow except in a narrow channel leading to Moose Factory, at the extreme southwest, the most important station, next to York Factory, of the Hudson's Bay Company on the Canadian coast. James Bay received its name from Thomas James (q.v.), who explored it in 1631-32.

JAMES ISLAND. One of the Sea Islands chain famous for cotton. It constitutes a township in Charleston Co., S. C., south of the city of Charleston (Map: South Carolina, E 4). Pop., 1900, 2570; 1910, 3147.

JAMES MILLIKIN UNIVERSITY. A coeducational institution of learning, comprising Lincoln College at Lincoln, Ill., and Decatur College and Industrial School at Decatur, Ill. Lincoln University was founded in 1865 by the synods of Indiana, Illinois, and Iowa of the Cumberland Presbyterian church. In 1901 certain amendments were made to the charter of the university which provided that it should change its name to Lincoln College and along with the new Decatur College constitute the James Millikin University. The reorganization was made possible by the liberal contributions of the founder, James Millikin, the citizens of Decatur, and the synods of Indiana, Illinois, and Iowa of the Cumberland Presbyterian church. With the union of the Cumberland Presbyterian and the Presbyterian U. S. A. churches the institution passed under the control of the latter denomination, though it is nonsectarian. The college at Lincoln in 1913 had 279 students, a faculty of 18, an endowment of $120,000, buildings, grounds, and equipment valued at $100,000, and a library of 7000 volumes. In the same year the college at Decatur reported 1128 students, a faculty of 58, an endowment of $220,600 with an assured annual income from the trustees of the Millikin estate representing $600,000 additional, buildings, grounds, and equipment valued at $594,000, and a library of 7800 volumes. Each college maintains an academic and a collegiate department. Lincoln College offers courses in liberal arts, fine arts, elocution, domestic economy, and music, and Decatur College in liberal arts, domestic economy, fine and applied arts, library science, manual training, commerce and finance, engineering, and music. The president in 1914 was George Emory Fellows, LL.D.

JAMES OF VIRAGGIO, vē-räj'ō. See Golden Legend.

JAMESON, jām'*son*, Anna Brownell (Murphy) (1794-1860). A British author, born in Dublin. She was the daughter of D. Brownell Murphy, the miniature painter, and married Robert Jameson, a barrister, from whom, however, she soon separated. Her first book, *The Diary of an Ennuyée* (1826), was followed by *Loves of the Poets* (1829) and *Characteristics of Women* (1832), a series of essays on Shakespeare's women, which is probably her best work and is still current in various editions. In 1836 she visited New England, where she remained two years. Her *Sacred and Legendary Art* is divided into four volumes: *Legends of the Saints* (1848), *Legends of the Monastic Orders* (1850), *Legends of the Madonna* (1850), and *The History of Our Lord* (1860), completed by Lady Eastlake and the most important of her art writings. Though Mrs. Jameson's work as a critic is of little value, her compilations contain much material not easily obtainable from other sources, and her style is pleasant and readable. Consult Macpherson, *Memoirs of the Life of Anna Jameson* (Boston, 1878), and biography by Richard Garnett in *Dictionary of National Biography*, vol. xxix (London, 1892).

JAMESON, James Sligo (1856-88). An English naturalist and African explorer, born at Alloa, Clackmannanshire. His early voyages were to Ceylon and Borneo. In 1878 he went to South Africa, succeeded in entering Mashonaland, and discovered the junction of the

Umniati and Umfuli rivers, besides bringing to England valuable ornithological specimens. After travels in the Rocky Mountains (1882), in Spain and Algiers (1884), Jameson joined Stanley's expedition for the relief of Emin Pasha early in 1887 and in June of the same year was left at Yambuya, where Tippu Tib was to reenforce him. These forces were slow to arrive and inadequate when they had come. Barttelot pressed on without Jameson in June of 1888 and was shot at Unaria. Jameson punished the assassin and did all in his power to induce Tippu Tib to accompany him in the search for Stanley, even offering £20,000 from his own funds. To communicate with England, he left Stanley Falls for Bangalas in August and there died of fever. He left a *Diary of the Emin Pasha Expedition* (1890). Stanley's account of Jameson's connection with a cannibal feast, which the latter sketched at Riba Riba, is probably exaggerated; but Jameson, by his own account, cannot be held blameless.

JAMESON, John Alexander (1824–90). An American jurist, born at Irasburg, Vt. He graduated at the State University (1846) and from 1867 to 1868 was professor of law in the University of Chicago. For many years he was assistant editor of the *American Law Register*. He wrote several legal works, including *The Constitutional Convention: Its History, Power, and Modes of Proceeding* (1867; 4th ed., 1887).

JAMESON, John Franklin (1859–). An American historian, born in Boston. He graduated from Amherst College in 1879 and in 1882 from Johns Hopkins University (Ph.D.), where he was an assistant and associate in history until 1888. From then until 1901 he was professor of history at Brown University and in 1901–05 served as professor and head of the department of history at the University of Chicago. In 1905 he became director of the department of historical research and editor of the historical publications of the Carnegie Institution. In 1906–07 Jameson was president of the American Historical Association. He was managing editor of the *American Historical Review* from 1895 to 1901 and again after 1905. He edited the *Correspondence of John C. Calhoun* (1900) and *Original Narratives of Early American History* after 1906 and published, further: *Willem Usselinx, Founder of the Dutch and Swedish West India Companies* (1887); *History of Historical Writing in America* (1891); *Dictionary of United States History* (1894, and published in 1904 in 3 vols. as the *Encyclopedic Dictionary of American History*).

JAMESON, Sir Leander Starr (1853–). A British physician, soldier, and administrator, who became prominent as leader of the raid into the Transvaal in December, 1895. A son of R. W. Jameson, writer to the signet, he was born in Edinburgh. He graduated from London University in 1875, received his M.D. in 1877, and in 1878, on account of ill health, went to Kimberley, Cape Colony, to practice his profession. Association with Cecil Rhodes led to his appointment as Administrator of Rhodesia in 1891, under the British South Africa Company. In that capacity he organized an expedition against the Matabele in 1893. In 1894 he was created a C.B. In the course of the discontent and political agitation among the Uitlander element in the Transvaal Republic, a body of troops commanded by Dr. Jameson was placed by Rhodes's orders on the borders of the Transvaal, prepared to act in case of disturbances. On receipt of a letter from Johannesburg, the seat of disaffection, Jameson, acting on his own judgment, invaded the Transvaal, with 600 men, on Dec. 29, 1895. On January 1, meeting with resistance at Krugersdorp, he shelled the town, but was unable to carry the position. The next day he moved towards Doornkoop, where, after 36 hours of almost continuous fighting, and the loss of 17 killed and 49 wounded, he was forced to surrender to the Boers. The raid was condemned throughout the civilized world. President Kruger handed Jameson and his officers over to the British government for punishment. They were taken to England and tried in London. In May, 1896, Jameson was sentenced to 10 months' imprisonment for an infringement of the Foreign Enlistment Act, but, owing to ill health, was released in December. He fought against the Boers in 1899–1900, was elected to the Cape Legislative Assembly for Kimberley in 1900, from 1904 to 1908 was Premier, and in 1910–12 was a member of the Cape Parliament. He was made first Baronet in 1911. A director after 1900 of the De Beers Consolidated Company, and after 1902 a director of the British South Africa Company, he also became president of the latter. Consult Garrett and Edwards, *The Story of an African Crisis* (Westminster, 1897), and "Cape of Good Hope, House of Assembly, 1897, Report of the Select Committee on the Jameson Raid into the Territory of the South African Republic," in *British Parliamentary Papers* (London, 1897).

JAMESON, Robert (1774–1854). A Scottish naturalist, born at Leith. He began the study of medicine, but, manifesting a fondness for natural history, went, in 1800, to Freiberg, Saxony, where he studied geology under Werner. In 1804 he returned to Edinburgh and was given the chair of natural history in the university there, which place he held until his death. The natural history museum of the university was largely indebted to Jameson's care and skill, for not only did he arrange its collections, but he also obtained a grant from the government for its maintenance. He founded the Wernerian Society in Edinburgh in 1808 and was a zealous advocate of the Neptunian theories of his master, which he subsequently abandoned, adopting Hutton's Plutonian or igneous theories of earth origin. With Sir David Brewster he founded, in 1819, the *Edinburgh Philosophical Journal*, and in 1826 the *Edinburgh New Philosophical Journal*, which he edited until his death. The geological articles of the fourth edition of the *Encyclopædia Britannica* were prepared under his supervision. His works include: *System of Mineralogy* (3 vols., 1804–08; 3d ed., 1820); *Elements of Geognosy* (1809); *Manual of Minerals and Mountain Rocks* (1821).

JAMESONE, or **JAMESON,** George (c.1587–1644). A Scottish portrait painter. He was born at Aberdeen, the son of an architect. After some practice as a portrait painter at Aberdeen, he went abroad and was a fellow pupil with Van Dyck under Rubens. He was employed by the city of Edinburgh, where he lived after 1630, to copy several portraits of the Scottish King's presentation to Charles I on the occasion of his first visit to Scotland in 1633, and was rewarded by the King with a diamond ring from his own finger. His reputation established, the most celebrated Scotchmen of the day sat to him. But the magistrate of Edinburgh refused to pay him his price for his portrait of Charles I. His work lacks distinction. Consult Bullock, *George Jamesone* (London, 1885).

JAMESONITE, jăm′sŭn-īt. A lead sulphantimonite, named after Prof. Robert Jameson, of Edinburgh (1774–1854). It is an occasional ore of lead and is sometimes associated with more important lead ores. It is sometimes called feather ore in reference to its fibrous divergent structure.

JAMESON RAID. See Jameson, Sir Leander Starr.

JAMES (or DAKOTA) RIVER. A navigable stream rising in Wells Co., N. Dak., about 60 miles northeast of Bismarck (Map: South Dakota, G 4). It flows southerly through a fertile country and joins the Missouri River about 9 miles east of Yankton, S. Dak. It is about 400 miles long in its general direction. It falls nearly 600 feet, but the fall is so uniform that the stream is incapable of much development as to water power. Only small tributaries flow into it.

JAMES RIVER. The largest river in Virginia. It is formed by the union of the Jackson and Cowpasture rivers, which rise in the Alleghanies (Map: Virginia, F 4). Its general direction is east-southeast, with many large bends and windings, and after widening into a broad and deep tidal estuary for the last 66 miles of its course, it flows into the lower part of Chesapeake Bay through Hampton Roads near Norfolk. The total length is about 335 miles, and its drainage basin is about 9700 square miles. The main stream and all of its confluents lie entirely within the State of Virginia. There is a nearly uninterrupted channel, about 100 feet wide and 18 feet deep, from Hampton Roads to Richmond Wharf. The western reach of the river opposite Richmond falls about 116 feet in 9 miles, thereby forming rapids which offer ample water power. The old James and Kanawha Canal, which followed the river from Richmond to Buchanan, is now abandoned. The chief tributaries of the James are the Appomattox from the right and the Chickahominy from the left, made famous by campaigns in the Civil War. It was on this river that Jamestown, the first permanent English settlement in America, was founded in 1607.

JAMES′TOWN. The first permanent English settlement within the limits of the United States, founded in May, 1607, by a small company under Captain Newport, in Virginia, on the banks of the James River, about 32 miles from its mouth. Here in 1619 the first legislative assembly in America was held, and here in the same year slavery was first introduced into the original thirteen Colonies. In September, 1676, the town was almost completely destroyed by Nathaniel Bacon. (See Bacon's Rebellion.) Up to 1698, when it was supplanted by Williamsburg, it was the capital of Virginia. The site of the settlement, which was originally a peninsula but is now an island, is owned by the Association for the Preservation of Virginia Antiquities. Ruins are left of a church, built probably between 1676 and 1684, of the fort, and of two or three houses. Near here is the site of the exposition held in 1907 to celebrate the tercentennial (see Jamestown Tercentennial Exposition) of the first permanent English settlement in the United States.

Bibliography. "Documents Illustrating the History of the Colony of Jamestown," in *Transactions of the American Antiquarian Society*, vol. iv (Worcester, Mass., 1860); M. L. D. Foster, *Colonial Capitals of the Dominion of Virginia* (Lynchburg, 1906); L. G. Tyler, *Cradle of the Republic; Jamestown and James River* (2d ed., Williamsburg, 1906); J. E. Davis, *Round about Jamestown* (Hampton, 1907); R. A. Pryor, *Birth of the Nation; Jamestown, 1607* (New York, 1907); S. H. Yonge, *Site of Old "James Towne," 1607–1698* (Richmond, 1907). For further details concerning the history of Jamestown, see Virginia.

JAMESTOWN. The capital and seaport, on the north coast, of St. Helena (q.v.), a British Admiralty coaling station. It consists of a long street, situated in a deep valley on the northwest coast. Its chief building is the observatory. In its vicinity is situated the tomb and first burial place of Napoleon I. Pop., 1911, 1439.

JAMESTOWN. A city in Chautauqua Co., N. Y., 70 miles by rail south by west of Buffalo, on the outlet of Chautauqua Lake, and on the Erie, and the Jamestown, Chautauqua, and Lake Erie railroads (Map: New York, A 6). Jamestown is a popular summer resort. It is connected by boat and steam and electric railroads with other resorts on the lake. One of the leading attractions of the city is Celoron, on Chautauqua Lake, a popular place of amusement. Among its buildings are the James Prendergast Free Library, the Women's Christian Association Hospital, and the Agnes Home for working girls. Jamestown is the centre of a productive farming district and has large manufacturing interests, including several worsted mills, furniture and lounge factories, saw mills, a cotton mill, and manufactures of metallic goods, voting machines, pianos, towels, bank vaults, and photographic paper. The city government is administered, under the charter of 1886 as revised in 1900, by a mayor, elected every two years, a unicameral council, and subordinate officials. Jamestown was settled in 1810, laid out in 1815, incorporated as a village in 1827, and chartered as a city in 1886. Pop., 1900, 22,892; 1910, 31,297; 1914 (U. S. est.), 34,878.

JAMESTOWN. A city and the county seat of Stutsman Co., N. Dak., 93 miles by rail west of Fargo, on the James River, and on the Northern Pacific and the Midland Continental railroads (Map: North Dakota, F 4). It has the State Hospital for the Insane, St. John's Academy, an Elks Home, Park View Hospital, Roman Catholic Cathedral, the Presbyterian College, a public library, and a fine courthouse. The city is a railroad centre and has farming, dairying, and stock-raising interests. There are grain elevators, flour mills, and other industrial establishments. The water works are owned by the city. Pop., 1900, 2853; 1910, 4358.

JAMESTOWN TERCENTENNIAL EXPOSITION was held on Hampton Roads, Va., from April 26 to Nov. 30, 1907, in commemoration of the three-hundredth anniversary of the first permanent settlement of Anglo-Saxon people in America. The site covered 350 acres at Sewall's Point, along the southern shore of Hampton Roads. The principal group of buildings, eight in number, were arranged around a square called Raleigh Court. Also there were two government buildings in which were shown the exhibits of the government departments. All these buildings were in the Georgian style of architecture. The smaller buildings included a Porto-Rican, Pan-American, and Mexican building in the Spanish-American Renaissance style. Arranged in a row along the wide street fronting the shore of Hampton Roads were the State buildings, mostly in the Colonial style of architecture and many of them reproducing some historical building. Typical of these may be mentioned the Maryland building, which was a reproduction of the house of Charles Carroll of Carrollton; the Massachusetts building, which was a reproduction of the old State House in Boston; and the Pennsylvania building, which was a replica of Independence Hall. An architectural feature of interest was the government piers, which extended 1600 feet northward into the waters of Hampton Roads and were connected by an arch, 200 feet in width, and elevated in the centre so as to permit the entrance of small vessels. The amusement features were grouped in the western part of the grounds along a continuous street called the War Path. There were about 2500 exhibits, which were classified among the following groups: (1) Historic Art; (2) Education and Social Economy; (3) Manufactures and Liberal Arts (including Graphic Arts); (4) Machinery and Transportation (including Electricity); (5) Agriculture and Horticulture; (6) Food Products and Accessories; (7) Forestry, Fish, and Game; and (8) Mines and Metallurgy. These exhibits were considered by a jury of awards, which awarded 665 gold, 640 silver, and 635 bronze medals. The attendance was between 4000 and 5000 daily, or in all the total admissions were about 2,800,000, of which 1,500,000 were paid. On North Carolina day the attendance was 60,000. The financial results were bad, and at the close of the exposition a statement issued showed the liabilities to be $3,465,000 and the assets $710,000, indicating a deficit of $2,655,000, against which was the ownership of the site. Consult *Final Report of the Jamestown Ter-Centennial Commission* (Washington, 1909) and *The Official Blue Book of the Jamestown Ter-Centennial Exposition, A.D. 1907* (Norfolk, 1909).

JAMESTOWN WEED. A weed of the solanum family. See Stramonium.

JĀMI, jä′mė, Nur-uddin ’Abd-urrahman (1414–92). A Persian poet, renowned for his romantic, lyric, and mystic writings, and often spoken of as the last of the transcendental sufi poets. Jāmi was born at the small town of Jam, near Herat, in Khorassan; on this account he is known as Jāmi, although he also plays upon his name in its significant sense as denoting that he was a mystic wine cup (Pers. *jām*, cup) of the divine love of God. His education seems to have been excellent, and his guiding principle in life was the philosophy of Sufism (q.v.), with all its mysticism. His poetic activity must have begun early, if we may judge from the number of works that are his, besides others which are attributed to him. Foremost among his works is a collection of seven poems entitled *Haft Aurang* (Seven Stars of the Great Bear, or Seven Thrones). One of the poems in this series is the tender love story of *Lailā u Majnūn;* another, the *Salāmān u Absāl,* is allegorical and moral in its treatment, and is known in English through Edward FitzGerald's version; a third, *Yūsuf u Zulaikhā* (trans. by Griffith, 1901), in the same collection, is the romantic tale of the passion which Joseph's beauty inspired in Potiphar's wife. Jāmi is likewise the author of a well-known prose work, *Baharistān* (Garden of Spring), composed about 1487 to give instruction to a son born to him in his old age. He composed also three divans or collections of lyrical poems and odes, written between the years 1479 and 1491. His death occurred at Herat, Nov. 9, 1492.

As a poet, Jāmi's talent is unquestioned; his verse is so polished and his art so finished as to contain almost elements of weakness owing to their refinement and perfection. His works are held in high esteem among the Persians, and some of the manuscripts of his poems are splendid specimens of Oriental calligraphy and illumination. His life and personality, moreover, seem to have been such as to win the favor of princes as well as to endear himself to the people because of his reputation for spiritual exaltation.

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JAMIESON, jä′mė-son, John (1759–1838). A Scottish philologist and antiquary. He was born in Glasgow, studied for the ministry at the university there, and in 1781 was ordained pastor of a congregation at Forfar, in connection with the Antiburgher secession body. In 1797 he was called to Edinburgh. His fame rests chiefly upon his *Etymological Dictionary of the Scottish Language* (1808), a work which shows great learning and industry. In 1818 he published an abridgment, and in 1825 two supplementary volumes. The book, while exceedingly valuable in definition and illustration and in its exposition of Scottish customs, was originally weak in its philology. This defect was remedied, however, in a revised edition (1879–87), edited by Dr. Longmuir and Mr. Donaldson. Among his other publications are: *Ancient Culdees of Iona* (1811); *Hermes Scythicus, or the Radical Affinities of the Greek and Latin Languages to the Gothic* (1814); *An Historical Account of the Royal Palaces of Scotland; Remarks on Rowland Hill's Journal* (1799).

JAMIN, zhȧ′măɴ′, Jules Célestin (1818–86). An eminent French physicist, born at Termes, Ardennes. He was educated at Rheims and at the Ecole Normale Supérieure; taught physics at Caen, at the Collége Bourbon (now Lycée Condorcet), and at the Louis le Grand; and in 1852, after publishing his valuable thesis on the reflection of light from metallic surfaces (1847), became professor at the Ecole Polytechnique, from which he resigned in 1881. On the death of Despretz (1863), Jamin succeeded him at the Sorbonne, where he was director of the physical laboratory until his death. He was elected to Pouillet's place in the Academy of Sciences (1868), of which he was secretary, 1884–86, and followed Milne-Edwards as dean of the faculty of science. An excellent botanist and geologist and a painter of some skill, Jamin was also a versatile physicist. His contributions to the *Comptes Rendus* of the Academy, numbering more than 80, treat of the critical point of gases, capillarity, hygrometry, compressibility of liquids, and many other subjects. But his fame rests on special studies in optics, magnetism, and electricity. Many of his articles deal with polarization and refraction. As a result of his theory of magnetic distribution, Jamin devised (1873) a very powerful magnet, composed of many laminæ, which was adopted for use in Gramme's machine. The Jamin electric light (1879) has carbons side by side, with points down, one fixed and one rotary; in general it resembles those devised by Wilde and Jablochkov, relights automatically, and casts a disadvantageous shadow. *A Cours de physique* (with Boutmy, 4th ed., 1886–91) and a *Petit traité de physique* (1870) were translated into German by Müllner and Recknagel respectively. Jamin published, besides, *Quelques phénomènes atmosphériques* (1880) and wrote essays in the *Revue des Deux Mondes*.

JAMITZER, yä′mĭts-ẽr, **GAMITZER**, gä′-mĭts-ẽr, or **JAMNITZER**, yäm′nĭt-sẽr, Wenzel (1508–85). The greatest of the German Renaissance goldsmiths. He was born in Vienna, but during his boyhood his family moved to Nuremberg, where he became a master workman in 1534. He was court goldsmith successively to the Emperor Charles V, Ferdinand I, Maximilian II, and Rudolph II. His grave in St. John's Cemetery, Nuremberg, is marked with a bronze epitaph designed by his friend and pupil, Jost Amman. His most famous works are: the silver jewel box in the Green Vault of the Royal Palace of Dresden, 13 inches high by 11 wide; the table centrepiece of gilded silver, 39 inches high, now in the collection of Baron Henri de Rothschild of Paris, made in 1549 for the city of Nuremberg at the price of 1325 gulden, sold in 1880 for 800,000 marks; miniature statues of Flora, Ceres, Bacchus, and Venus, in the Imperial Treasury of Vienna (the surviving part of a centrepiece made for Rudolph II); a jewel box picturing the deeds of Hercules, in the Bavarian Treasury at Munich; a cup with the figure of Maximilian II, now in the possession of the German Emperor. Jamitzer's mark was a lion's head, sometimes accompanied by a W. He made many designs for ornamental gold and silver plate, some of which were reproduced as line engravings, etchings, and wood engravings. There are collections of his drawings in Basel, Coburg, Nuremberg, Erlangen, and Paris. Of the engravings, a number are illustrated by Bergau. Jamitzer was the first German master to break entirely with Gothic and adopt definitely and completely the forms of the Italian Renaissance. Being unable to study the originals, he made much use of Italian engravings, particularly those of Enea Vico and those of Lazarus de Baif. The latter's *De Vasculis*, published in Paris in 1536, was also a source of inspiration to Du Cerceau, which accounts for the similarity of many of his compositions to Jamitzer's.—Christopher (1563–1618), Wenzel's grandson, is known as a goldsmith by works now in Vienna, Berlin, and Moscow, and as an engraver by his *Groteskenbuch*. Consult Bergau, *Wenzel Jamitzers Entwürfe* (Berlin, 1879), and, for Nuremberg documents illustrating the history of the family, Frankenburger, *Wenzel Jamnitzer* (Strassburg, 1901).

JAMMU, jŭm′ōō. A town and fort in the south of Kashmir, India, 25 miles north of Sialkot by rail (Map: India, C 2). It was the ancient capital of a Rajput kingdom, and it stands amid the Himalayas, on both banks of the Tavi, an affluent of the Chenab—the town on the right side and the fort on the left. Here are the palaces of the Maharajah and his kin, several temples, the Prince of Wales College, and the hospital. Jammu is the terminus of a branch railway, and the starting point of the busy trade route to Srinagar and the Kashmir valley. Jammu at the end of the eighteenth century was said to be a city of 150,000 inhabitants, but new trade routes have robbed it of its importance. Coal mines have been opened in the vicinity, and its prestige may return. Since 1889 a modern system yields a good water supply. Pop., 1901, 35,672; 1911, 31,726.

JAMNA, jŭm′nȧ. A river of India. See Jumna.

JAMNITZER. See Jamitzer.

JAMYN, zhȧ′mäɴ′, Amadis (c.1530–c.1593). A French poet, born at Chaource (Aube). He was made secretary at the court of Charles IX through the influence of Ronsard, and Sainte-Beuve says his friendship with this poet is his principal claim on our interest. He translated the last 12 books of the *Iliad*, a continuation of the work begun by Hugues Salel, and the first three books of the *Odyssey* (1574), and brought out two volumes of poetry, *Œuvres poétiques* (1575 and 1584). His poems were edited by Brunet, with a life by Colletet (Paris, 1879).

JAN, yän, Karl von (1836–99). A German musical savant, born at Schweinfurt. Although his real profession was philology, he made a special study of the music of the ancient Greeks, and came to be one of the foremost scholars in this field. He began his career as a teacher at the Gymnasium in Berlin, but soon went to Landsberg, where he remained till 1875. From then until 1883 he was in Saargemünd. In that year he was appointed professor at the Lyceum of Strassburg, which position he retained till his death. The results of his researches he published in essays which appeared in various journals. Perhaps the most important of these is *Kitharodik*, giving entirely new and valuable information about the Greek kithara and lyre (1882). His principal work is *Musici Scriptores Græci* (1895), a critical text edition of all Greek writers on music, with an appendix, *Melodiarum Reliquiæ*, containing all known fragments of Greek music in notation (1899).

JANA. See Janus.

JANAUSCHEK, yä′nou-shĕk, Fanny, or Franziska (1830–1904). A well-known actress, born at Prague, Bohemia, July 20, 1830. From childhood she gave evidence of dramatic talent, and her first appearance was at her native place. After a successful experience at Cologne she became established as leading actress at Frankfort (1848), remaining till 1860, when she began a series of successful engagements in other German cities. In 1867 she came to America, playing in New York and elsewhere, in the German language. Resolved to play in English, she came again to America in 1873 and very effectively presented Medea, Lady Macbeth, Iphigenia, and other tragic parts. She extended her reputation by further tours in Europe and Australia, but finally settled in the United States, where she appeared in less classic representations, among them *Meg Merrilies* and *The Great Diamond Robbery* (1895–96). After her retirement she took up her residence in Brooklyn, N. Y.

JANE EYRE, âr. A novel by Charlotte Brontë (Currer Bell) (1847). It is partly autobiographical, especially in the school life and early career of the heroine.

JANES, Edmund Storer (1807–76). An American Methodist Episcopal bishop, born at Sheffield, Mass. He read law while teaching school (1824–30), but instead of becoming a lawyer entered the ministry, joining the Philadelphia conference of his church in 1830. In 1838 he was appointed financial agent of Dickinson College and in 1840 financial secretary of the American Bible Society. He was elected Bishop of the Methodist Episcopal church in 1844, when 37 years old. No other Bishop of the church has ever been elected at so early an age. At the time of his death he was the senior Bishop of the church, and president of the Missionary Society, of the Board of Church Extension, and of the Sunday School Union and Tract Society of the church. He was also one of the managers of the American Bible Society, a director of the American Colonization Society, and trustee of several institutions. After the Civil War he labored in the reconstruction of the work of the church and nation in the South. He represented the American Methodist church abroad in 1865. He died in New York City. Consult H. B. Ridgaway, *The Life of Edmund S. Janes* (New York, 1882).

JANE SHORE. 1. A tragedy by Chettle and Day (1603), founded on the story of the beautiful and unfortunate mistress of Edward IV. 2. A tragedy by Nicholas Rowe (1714), which was popular for a long time and furnished one of Mrs. Siddons's leading rôles.

JANES'VILLE. A city and the county seat of Rock Co., Wis., 79 miles by rail west by south of Milwaukee, on the Rock River and on the Chicago and Northwestern and the Chicago, Milwaukee, and St. Paul railroads (Map: Wisconsin, E 6). It is built partly on level and partly on elevated ground and is the seat of the State School for the Blind. The public library, courthouse, city hall, high school, and Y. M. C. A. buildings are all worthy of mention. The city is the centre of a fertile agricultural region, has a considerable trade in tobacco, grain, and sugar beets, grown in the vicinity, and manufactures cotton and woolen goods, shoes, fountain pens, agricultural implements, furniture, barbed wire, carriages, and cement building products. Settled about 1837, Janesville was incorporated in 1853 and adopted the commission form of government in 1912. Pop., 1900, 13,185; 1910, 13,894; 1914 (U. S. est.), 14,195.

JANET, zhȧ'nȧ', Paul (1823–99). A French philosophical writer, born in Paris and educated at the Ecole Normale. He was lecturer on philosophy at Bourges (1845–48), was then professor at the University of Strassburg until 1857, at the Lycée Louis le Grand in Paris, and in 1864–97 at the Sorbonne, succeeding Caro. He was elected a member of the Institute in 1864. In general he advocated the principles of Cousin. His peculiarity was a conciliatory method, seeing in various philosophic systems not oppositions, but mere developments of truth; but his eclecticism is very strongly affected by his spiritualistic bias. His numerous works include his *Histoire de la science politique dans ses rapports avec la morale* (1850, 1872); *La famille: Leçons de philosophie morale* (1855), crowned by the Academy; *Philosophie du bonheur* (1862, 1873); *Le matérialisme contemporain en Allemagne* (1864); *Les problèmes du XIXème siècle* (1872, 1873); *Saint-Simon* (1872); *Les causes finales* (French, 1874; Eng., 1883); *Philosophie de la Révolution française* (1875); *Les maîtres de la pensée moderne* (1883); *Les origines du socialisme contemporain* (1883); *Victor Cousin et son œuvre* (1885); *La philosophie de Lamennais* (1890); *Fénelon* (1892); *Principes de métaphysique et de psychologie* (1896).

JANE'WAY, Edward Gamaliel (1841–1911). A distinguished American physician, born near New Brunswick, N. J. He graduated from Rutgers College in 1860 and from the College of Physicians and Surgeons, New York, in 1864, having served as acting medical cadet in the United States Army Hospital at Newark, N. J., from 1862 to 1863. He was on the resident staff of Charity Hospital, Blackwell's Island, New York (1864), and of Bellevue Hospital (1864–66), and then, establishing himself in private practice, soon became a consultant of eminence, especially in the diseases of the organs of the chest and abdomen. For several years, beginning in 1867, he was curator and pathologist to Bellevue Hospital. Janeway's career as a teacher of medicine began in 1872, when he was elected instructor in pathological anatomy in the medical department of New York University. In Bellevue Hospital Medical College he was professor of materia medica and therapeutics from 1873 to 1876, professor of pathological anatomy from 1876 to 1881, associate professor of the principles and practice of medicine from 1881 to 1884, and professor from 1884 to 1891. Six years later he resumed his connection with the college upon the adoption of the plan to consolidate it with the medical department of New York University, as University and Bellevue Hospital Medical College, becoming professor of clinical medicine and president of the faculty; later (1898–1905) he was dean, and after 1898 professor of medicine. He rendered important professional services as visiting or consulting physician to a number of New York hospitals and was president of the Pathological Society, the New York Academy of Medicine, and the Association of American Physicians (1900). From 1875 to 1881 he was commissioner of health of New York City.

JA'NI. See Forum (at the beginning).

JANIC'ULUM, or Mons Janiculus. A long ridge or hill on the west bank of the Tiber at Rome, rising to a height of about 300 feet above the sea. The name is derived by tradition from Janus, King of the aborigines, who founded a city on the hill opposite to the Capitoline, then occupied by Saturn. From its argillaceous formation it shares with the Vatican Hill the name of *monti della creta*. It was anciently called Mons Aureus, from the golden color of its sands, whence the modern name Montorio. The commanding position of the hill led to its early fortification by the kings of Rome; but it was not included in the city until the time of Augustus, who made it the fourteenth quarter, under the name of Regio Transtiberina, now Trastevere. In early times it was connected with the east bank only by the Sublician Bridge, which was supplemented in 181 B.C. by the Æmilian Bridge, and in 366 A.D. by the Bridge of Valentinian, represented by the modern Ponte Sisto. The hill commands a magnificent panoramic view of

Rome. Consult Richter, *Topographie der Stadt Rom* (2d ed., Munich, 1901), and Baedeker, *Central Italy and Rome* (15th Eng. ed., Leipzig, 1909).

JANIN, zhȧ'năɴ', Jules (1804–74). A French critic, born at Saint-Etienne, Feb. 16, 1804. Besides his journalistic cleverness, Janin was skillful as a novelist in knowing what the public would like next. He is perhaps the best representative of the individualistic vagaries of romanticism, both in his style and thought. His earlier novels are ultraromantic and trivial; the later ones, such as *La religieuse de Toulouse* (1850) or *Gaietés champêtres* (1851), are never natural, but often charming. His best journalistic papers, written for the *Journal des Débats*, are collected in a *Histoire de la littérature dramatique*. In 1870 he was elected to the French Academy. His *Œuvres choisies* (12 vols., 1875–78) were edited by A. de la Fitzelière.

JANINA, yä'nē-nȧ, or **YANINA**. A town of northwestern Greece, situated near the Albanian frontier, on the Lake of Janina (Map: Balkan Peninsula, C 5). Although the splendid buildings of the old city are now in a state of decline, there are still a number of mosques, churches, synagogues, a Greek gymnasium, a library, and a hospital. The chief manufactures are gold ware and silk goods. Pop. (est.), 22,000, including about 15,000 Greeks and about 2500 Jews. Janina is mentioned as early as the ninth century, when it formed a part of the Byzantine Empire. During the eleventh and twelfth centuries it was destroyed by the Normans and fell into the hands of Turkey in 1430, in whose possession it long remained, constituting the capital of the Vilayet of Janina. From 1788 to 1822 it was the seat of the famous Ali Pasha, "the Lion of Janina." On March 6, 1913, after undergoing a protracted siege, Janina was captured by the Greeks, and by the territorial settlements of that year, following the Balkan War (q.v.), especially by the treaties of London and Bucharest, was formally ceded to Greece.

JAN'IS, Elsie (Elsie Janis Bierbower) (1889–). An American actress, born at Delaware, Franklin Co., Ohio. She first appeared on the stage at Columbus, Ohio, in 1897, and her first appearance in New York City was in 1900 on the vaudeville stage. She starred in *The Belle of New York* in 1904 and in *The Vanderbilt Cup* in 1906–07. Subsequently she played in *The Hoyden* (1907); *The Fair Co-ed* (1908–09); *The Slim Princess* (1910–11); a play written by herself, *A Star for a Night* (1911); *The Lady of the Slipper* (1913), in which she starred with Montgomery and Stone; *The Passing Show* (1914), in London.

JANITSCHEK, yä'nē-chĕk, Hubert (1846–93). An Austrian art historian, born at Troppau, Silesia. He studied at the university at Graz from 1868 to 1873, then pursued art historical studies in Italy until 1877, when he was appointed custodian of the Austrian Museum of Art and Industry in Vienna. Afterward he became professor, successively, at the universities of Prague (1879), Strassburg (1881), and Leipzig (1891). His sound and scholarly researches in the history of Italian and German art resulted in the publication, among other works, of *Die Gesellschaft der Renaissance in Italien und die Kunst* (1879); *Zwei Studien zur Geschichte der karolingischen Malerei* (1885); the important volume, *Geschichte der deutschen Malerei*, in Grote's *Geschichte der deutschen Kunst* (1890); *Dantes Kunstlehre und Giottos Kunst* (1892); and a number of biographies of Italian masters in Dohme's *Kunst und Künstler*.—His wife, Maria (1859–), a poet and novelist, was born in Vienna. After her husband's death she settled in Berlin and afterward at Rome and Munich. Among her principal works may be mentioned: *Im Kampf um die Zukunft* (1887), an epic poem; *Gesammelte Gedichte* (1892; new ed., 1910); *Aus alten Zeiten* (1900); and the novels and tales *Lichthungrige Leute* (1892), *Gott hat es gewollt* (1895), *Frauenkraft* (1900), *Harter Sieg* (1901), *Ein Stück modernen Lebens* (1903), *Irrende Liebe* (1909), and *Stille Gäste* (1912). Although not always true to nature, her writings attract by reason of their temperamental qualities and their sincere treatment of the problems of modern life.

JANIUAY, ʜä'nē-wī'. A town of Panay, Philippines, in the Province of Iloilo, situated in a beautiful valley among the mountains in the interior of the island, about 18 miles north-northwest of Iloilo (Map: Philippine Islands, D 5). Oil has been found in the neighborhood. It produces textiles of piña, silk, and cotton. Pop., 1903, 20,738. It was founded in 1578, under the name of Matagub. In 1903, after the census, Lubano (pop., 6661) was annexed.

JANIZARIES, jăn'ĭ-zȧ-rĭz, or **JAN'ISSARIES** (OF. *jannissaire*, Fr. *janissaire*, It. *giannizzero*, from Turk. *yeñicheri*, new troops, from *yeñi*, new + Ar. *askar*, army, soldier). A Turkish military force, first instituted by Orkhan (1326–59), the son and successor of Othman, the founder of the Ottoman Turkish Empire, who levied from the conquered Christian peoples a systematic tribute of young children. These tribute children, always the healthiest and strongest, were trained under Mohammedan tutelage, and, together with Christian captives taken in war and Turkish subjects attracted by the special privileges offered, constituted a special corps of picked troops, which was thus composed of many nationalities. In turn it became the bulwark of the Empire, and, like the Roman prætorians and Russian streltsi, assumed dictatorial power. The corps was more perfectly organized by Amurath I after 1360, when its strength was raised to about 12,000. After the sixteenth century the drafting of Christian children and captives ceased, and the corps was recruited by voluntary enlistment. There were two classes of janizaries—one a standing force, garrisoned in Constantinople and the chief towns and varying in number from 25,000 to 100,000; the other a trained militia known as jamaks, scattered throughout all the towns of the Empire and numbering from 300,000 to 400,000. The janizaries proper were divided into ortas, or regiments. At the head of the whole force was the aga, whose power extended to life and death, for the janizaries were always ready to break out into deeds of violence if their pay or perquisites were withheld. In times of peace they acted as a police force. They served on foot, generally formed the reserves of the Turkish army, and were noted for the wild impetuosity of their attack. The Sultan's bodyguard was formed of them. They became in the course of time very unruly, and their history abounds in conspiracies, assassinations of sultans, viziers, and agas, and atrocities of every kind; so that by degrees they became more dangerous to the sultans than to foreign enemies. Attempts were made by several sultans to reform or dissolve the corps, but they were always unsuccessful. The reforms of Sultan Mahmud II (q.v.) were bitterly opposed by the janizaries, especially the reorganization of the army on the European model. This opposition broke forth in open revolt, and on June 15, 1825, Mahmud ordered the flag of the Prophet to be unrolled and the Faithful to be arrayed against the mutinous corps. The janizaries, deserted by their aga and other principal officers, were defeated, with the loss of 16,000 men; their barracks were burned and 6000 to 8000 of them were killed in the assault or perished in the flames. A proclamation of June 17, 1826, declared the janizary force dissolved. All opposition was drowned in bloodshed. Thousands were put to death, and more than 20,000 were banished. In the Imperial Museum at Constantinople are 150 life-size figures illustrating the appearance of these famous troops. Consult: M. d'Ohsson, *Tableaux de l'Empire Ottoman* (Paris, 1787–1820); Es'ad Effendi Essejjid Mehemed, *Précis historique de la destruction du corps des Janissaries par le Sultan Mahmoud en 1826* (ib., 1833); A. Djévad Bey, *Etat militaire Ottoman* (Constantinople, 1885); Heinrich Schwartz, "Die Janitscharen," in *Preussischen Jahrbuch*, vol. cxii (Berlin, 1903); Theodor Menzel, "Das Korps der Janitscharen," in *Beiträge Zur Kentniss der Orients*, vol. i (ib., 1904).

JANIZARY MUSIC. A term applied to music produced by a combination of shrill wood wind and brass instruments, various kinds of drums, and triangles.

JANK, yänk, ANGELO (1868–). A German painter and illustrator. He was born in Munich and studied under Höcker and Löfftz at the Munich Academy, where he was appointed professor in 1907. His best-known paintings are hunting scenes, distinguished by broad brushwork and rhythmic movement, such as "The Hunt" and "The Horsewoman," exhibited in the Metropolitan Museum, New York, in 1909. Other works are "Hurdle Race" (Elberfeld Museum); "Mailed Defense," in the possession of the King of Italy; an equestrian portrait of the Duke of Saxe-Coburg-Gotha; "The Princess and the Swineherd" (Society of Historical Art, Munich). Jank became a contributor to the Munich paper *Jugend*, and his chromolithographs are popular throughout Germany. He was commissioned by the government to paint a large historical composition in the German Reichstag, and in 1905 received the great gold medal at Munich.

JANKÓ, yŏŋ'kō, PAUL VON (1856–). An Hungarian pianist and inventor of the Jankó keyboard. He was born at Totis, Hungary, and studied music at the Vienna Conservatory, the piano with Ehrlich in Berlin, and mathematics at the University of Berlin. Owing to the smallness of his hands, he had great trouble in playing music which involved octaves, and he turned his attention to constructing a keyboard which would obviate the difficulty. From 1886 to 1890 he made extensive concert tours to demonstrate his new invention. In 1892 he settled in Constantinople. See JANKÓ KEYBOARD.

JANKÓ KEYBOARD. A keyboard for the pianoforte invented by Paul von Jankó (q.v.) in 1882. This was introduced to the English public in 1888 and in New York in October, 1890. The Jankó keyboard consists of six rows or banks of keys, placed in a semicircle and presenting a fanlike appearance. Each note has three different keys, one lower than the other and attached to a key lever, so that each key may be struck in three different rows. Six parallel rows of whole-tone intervals are thus produced. The keyboard slants, the keys are rounded on both sides, and the sharps and flats are distinguished by black bands. A freer use of the fingers is claimed than with the accepted keyboard. By reason of the many rows the hand can maintain its natural position with the long fingers on the upper notes and the shorter ones on the lower. All scales and chords have uniform fingering, the relative position being the same in all keys, and the only necessary change is to raise or lower the entire hand. The octave is brought within the stretch of the sixth on the ordinary keyboard, and half tones may be played legato with one finger. The new keyboard can be adapted to any pianoforte, grand, upright, or square, without harm to the instrument. Chromatic scales in thirds, sixths, and octaves can be executed with as much facility as the ordinary scale on the ordinary pianoforte, because one performer can produce effects that now are obtainable only in four-hand playing. Yet in spite of positive merits, the interest shown by some eminent pianists, and the foundation of a Jankó Society in Vienna in 1905, the new invention has not met with success.

JAN MAYEN (yän mī'en) **ISLAND.** A volcanic island in the Arctic Ocean, situated between lat. 70° 49′ and 71° 9′ N. and between long. 7° 53′ and 9° 5′ W., about 220 miles north-northeast of Iceland (Map: Arctic Regions, J 5). It is oblong in shape and has an area of about 160 square miles. The surface is generally mountainous and reaches in the extinct volcano, Beerenberg, in the north, an altitude of 6000 feet or more. There are some volcanoes on the island, Mount Beerenberg being the highest, and a number of glaciers. The mean annual temperature is somewhat less than 28° F. In the seventeenth century there were seven extensive summer colonies maintained on Jan Mayen for exploiting the valuable whaling fisheries around the island. At present it has no permanent population, but is occasionally visited by sealers and explorers. In 1882–83 Jan Mayen Island was the seat of the Austrian international polar station. Sighted by Hudson in 1607, the island was rediscovered in 1611 by Jan Mayen, after whom it is named. Consult: Wohlgemuth, *Osterreichische Polarstation Jan Mayen* (Vienna, 1886); Ernesto Lyders y Stamm, *Derrotero de Islandia é instrucción náutica para la Isla Juan de Mayen* (Madrid, 1895); J. B. A. E. Charcot, "Une excursion à Jan-Mayen," in *Géographie*, vol. vi (Paris, 1902).

JANNARIS, yȧn'nȧ-rēs, ANTHONY (1852–1909). A Cretan scholar and public official. He was head master of the public Gymnasium at Canea in 1883–85 and lectured at the University of Athens in 1889. For taking part in the Cretan insurrection in 1889 he was proscribed by the Sultan of Turkey and was obliged to flee to London, where he remained six years. When he returned to Crete, he was elected a member of the Assembly, was correspondent for the London

Times during the troubles of 1897, and in 1907 became inspector general of education. He compiled Greek grammars and dictionaries, wrote many books and reviews, and is author of Cretan folklore stories.

JANNES, jăn′ēz, and **JAMBRES**, jăm′brēz, or, according to some authorities, Mambres. According to an apocryphal story, the names of two Egyptian magicians who withstood Moses (cf. Ex. vii. 11, etc.; 2 Tim. iii. 8). As the names seem to be Hebrew, the story was probably of Jewish origin. Its beginning was as early as the second century B.C., but it was constantly receiving additions until at last in both Jewish and Christian circles there was an extensive cycle of stories concerning these two men. In these Jannes and Jambres are represented as very skillful Egyptian magicians, who were able even to counteract the most severe of the plagues Moses brought upon Egypt. As demonic spirits, they continued their malignant activity against Israel during the wandering in the wilderness, but at last were destroyed through Phinehas' use of the Divine name. One story relates that Jannes died first and went to the deepest place of torment, whence his spirit addressed his brother Jambres, warning him to repent ere it was too late. According to Origen and the *Decretum Gelasii*, there was an apocryphal book of Jannes and Jambres. Origen supposed that Paul depended on this for the statement in 2 Timothy, though the Apostle may have alluded only to a well-known story for the sake of illustration without being acquainted with the book. Consult: Emile Schürer, *Geschichte des jüdischen Volkes*, vol. iii (4th ed., Leipzig, 1901–11); Kohler, in *The Jewish Encyclopædia*, vol. vii (New York, 1901–06); Max Förster, "Das lateinisch-altenglische Fragment der Apokryphe von Jannes und Mambres," in *Archiv für die Studium der neueren Sprachen und Litteratur*, vol. cviii (Brunswick, 1902).

JANNET, zhȧ′nȧ′, Claudio (1844–94). A French publicist, born in Paris. He studied for the bar and afterward became professor of political economy at the Catholic University of Paris. His works include: *De l'état présent et de l'avenir des associations coopératives* (1867); *L'Internationale et la question sociale* (1871); *Les institutions sociales et le droit civile à Sparte* (1874); *Les Etats-Unis contemporains* (1875; 4th ed., 1888), an important work; *Les sociétés secrètes* (1876); *Les précurseurs de la francmaçonnerie* (1887); *Le socialisme d'état et la réforme sociale* (1889); *Le capital, la spéculation et la finance au XIXème siècle* (1892). In theory Jannet was a disciple of Le Play.

JAN′NEY, Samuel Macpherson (1801–80). An American Quaker preacher, historical biographer, and poet, born in Loudoun Co., Va. He was a member of the Hicksite Society of Friends and served as a superintendent of Indian affairs in 1869. His publications in prose include: *Conversations on Religious Subjects* (1835); *Historical Sketch of the Christian Church* (1847); *Life of Penn* (1852); *Life of Fox* (1855); *History of the Religious Society of Friends from its Rise to 1828* (1867). His best-known writings in verse are *The Country School House* (1825) and *The Teacher's Gift* (1840).

JANOW, jä′nôv, Matthias von (?–1394). A Catholic prelate, often called a precursor of Huss. Of his early history little is known. He was educated at the University of Prague and the University of Paris. Visiting Rome, he was appointed in 1381 canon and confessor in the cathedral of Prague and continued to perform the duties of the office until his death. In his book, *Regula Veteris et Novi Testamenti*, he alleges the corruption of the Church in all its parts and explains the causes of it. He advocated the removal of images from the churches, but never revolted from ecclesiastical authority. He died in 1394 and 16 years later his works were burned with those of Wiclif. Consult Lützow, *Life of John Hus* (New York, 1909).

JANS, yäns, Anneke or Annetje (?–1663). An early Dutch colonist of New Netherland, famous because of lawsuits concerning her farm between her heirs and the corporation of Trinity Church, New York City. She emigrated from Holland to New Netherland with her husband, Roeloff Jansen, in 1630. In 1636 the latter obtained a grant of 62 acres of land on Manhattan Island, extending from the present Warren Street to the neighborhood of Desbrosses Street and lying between Broadway and the Hudson River. Soon afterward Jansen died, and she married the Dutch dominie Everardus Bogardus (q.v.). In 1654, after her husband's death, she secured a patent to the farm in her own name and later removed to Albany, where she died, leaving her property to be divided among her eight surviving children. After the English had taken possession, in 1664, all property holders were required to secure new titles for their lands. Accordingly the heirs secured a new patent for the farm from Governor Nicolls, on March 27, 1667. Four years later, March 9, 1671, the property was sold to Governor Lovelace, all of the heirs signing the deed of transfer except the wife and child of Cornelius Bogardus, a son of Anneke and her second husband, who had died in 1666. It is largely upon this omission that the subsequent suits have been based. Upon the recall of Governor Lovelace (q.v.) the government confiscated the Jans farm and subsequently granted it to Trinity Church by a patent sealed on Nov. 23, 1705. In 1749 Cornelius Brower, a descendant of the Cornelius Bogardus whose heirs had not signed, took forcible possession of a portion of the farm and on being evicted began an action against Trinity Church, which was decided against him. In 1757 he made another unsuccessful attempt. Another Cornelius Bogardus took possession of part of the estate in 1784 and held it until he was evicted by the courts in 1786. His son John brought suit in 1830 to secure one-thirtieth of the farm and a proportionate share of back rents. In order to secure the money necessary to carry on this suit, he sent circulars to all the descendants of Anneke Jans, asking them to contribute, which they did most liberally until 1847, when judgment was again given for the church. Since then several other suits have been brought by the heirs, but they have been uniformly decided in favor of the defendants. Consult: Nash, *Anneke Jans Bogardus: Her Farm, and how it Became the Property of Trinity Church, New York* (New York, 1896); *Sandford's Chancery Reports*, vol. iv, pp. 633–672; Schuyler's *Colonial New York*, vol. ii; *Harper's Monthly Magazine* for May, 1885.

JANS, Jansen Enikel, or Enenkel. An Austrian historian and poet of the thirteenth century. He wrote a rhymed *Weltchronik*, entirely worthless as history, but containing many anecdotes and tales which give it a certain literary value (ed., by Strauch in *Monumenta Germaniæ Historica*, vol. ii, part i, 1891), and a *Fürstenbuch* (ed. by Rauch in *Scriptores Rerum Austriacarum*, vol. i, 1790), which, though equally unscientific, describes the reigns of the Austrian dukes Leopold VII and Frederick the Quarrelsome with a good deal of picturesqueness and vigor. Consult Scherer, *Litterarisches Centralblatt* (Leipzig, 1868).

JANSEN, yän′sen, OLAÜS (1714–78). A Swedish naturalist, born at Christianstad. He went to Germany for his education and was appointed professor at Tübingen University. Thence he went to a similar position at Copenhagen, and in 1764 he was ordered by the Danish government to make a study of the natural resources of South America; but his travels extended north to Central America and Florida. In 1772 he visited New England. His published works include: *Aanden i Naturvidenskaben og Naturens almindelige Lære* (1773); *Neue Reisen durch Brasilien und Peru* (1775); *Neue Reisen durch Louisiana und Nueva España* (1776); *Anmärkningar till Historia Naturalis och Klimatet i Nye England och Nye Spanien* (1778).

JANSENISM, jăn′sen-ĭz'm. The name applied to the doctrines of a party in the Church of France which led to bitter controversies in the last half of the seventeenth and the beginning of the eighteenth century. It was a combination of three different tendencies. On the more abstruse theological side it derived from the doctrines of Jansenius, Bishop of Ypres, on the question of grace, and took its name from him; a second equally strong tendency carried the Jansenists into opposition to the current practice in regard to the sacraments and the spiritual life, as a consequence of the influence of the Abbé de Saint-Cyran; while a third characteristic was a spirit of opposition to the government which made them the legitimate heirs of the Fronde. The first two tendencies found determined opponents in the Jesuits, whose stand on the question of grace and whose practice in moral theology were attacked by them; and the third brought the leaders of the party into conflict with the absolute monarchy of Louis XIV.

The Reformation, with its special doctrines as to original sin and justification, had tended to recall attention to the difficult questions of grace and man's free will. Since the famous controversy in the fifth century between St. Augustine on one side and Pelagius and John Cassian on the other, the doctrines of the latter, who exaggerated the part played by the human will (see FREE WILL) at the expense of divine grace, had taken their place in the list of heresies, while that of St. Augustine had held the field. Adopted by St. Thomas Aquinas and the Dominicans in the thirteenth century, it was opposed to some extent by the Franciscan Duns Scotus and became a constant source of controversy between the two orders. In the sixteenth century the discussion became more violent, especially at the University of Louvain, where Michel de Bay, known as Bajus (q.v.), taught what professed to be the Augustinian doctrine, but was actually a violent exaggeration of it, not a little resembling that of Calvin. At the same time the University of Salamanca was agitated by cognate questions, and the theses of the Dominican Bañez and the Jesuit Molina arrayed the orders against each other. Clement VIII established a special congregation, called De Auxiliis Gratiæ, to consider these questions, but his successor, Paul V, finally, for the sake of peace, forbade the two parties to accuse each other of heresy, thus leaving the question, in a sense, open.

The publication, in 1640, of the *Augustinus* of Jansenius (q.v.) added new vigor to the controversy. Its theories about the relation of grace to human nature, singularly close to Calvin's views, were immediately attacked by the Jesuits. By the bull *In eminenti* of 1642, Urban VIII confirmed the prohibition of it by the Inquisition as contravening the decree of Paul V and as renewing some of the condemned propositions of Bajus. But this did not put an end to its influence. Jansenius' friend, Saint-Cyran, had succeeded in grouping around him at Port-Royal a community imbued with similar doctrines; it was small in numbers, but strong in personal character. Besides Antoine Arnauld, who became the leader of the party on Saint-Cyran's death in 1643, and others of his family, it included the learned Lemaître de Sacy, the moralist Nicole, the preacher Singlin, and Pascal. In 1643 Arnauld, in his book *De la fréquente communion*, attacked the practice of the Jesuits in regard to the sacraments; and later, Pascal, in his celebrated *Lettres à un provincial* (1656–57), with the most brilliant irony but with very little regard for the rules of fair controversy, made an onslaught on their moral theology. But the society pursued its end. It had a certain number of propositions from the *Augustinus* submitted to the theological faculty of Paris, and five of them were eventually presented to the holy see for judgment, by 88 bishops. By the bull *Cum occasione* of May 31, 1653, Innocent X declared these five heretical. They were as follows: 1. Certain commandments of God are impossible to just persons even desiring and endeavoring to keep them, according to the strength which they then possess; and such grace as would render them possible is lacking to them. 2. In the state of fallen nature internal grace is never resisted. 3. In order to merit and demerit in the state of fallen nature, freedom from necessity is not required of man, but it suffices that there be freedom from constraint. 4. The Semi-Pelagians admitted the necessity of internal prevenient grace for each separate act, and even for the beginning of faith; their heresy consisted in this, that they considered that grace to be such as the will of man might either resist or obey. 5. It is a Semi-Pelagian error to say that Christ died or shed His blood for all men absolutely.

The Jansenists attempted to evade the force of this bull by contending that the five propositions were not found in the *Augustinus*, or at least not in the sense in which they were condemned, and pointed out that papal infallibility (q.v.) did not extend to questions of fact; therefore, they maintained, the book was not really condemned. The propositions may not have been there—Louis XIV commissioned the Comte de Grammont to read the book and see if they were, and the witty courtier reported that, if they were, they were there incognito—but it was indisputable that they represented the very pith and marrow of the Jansenist position. Alexander VII renewed their condemnation, declaring expressly that they were found in the book, and condemned in the sense there given to them. Later, he drew up a formulary to be signed by all the bishops and religious of France, in these terms: "I submit myself sincerely to the constitution of our holy Father Innocent X, and I condemn with heart and mouth the doctrine of the five propositions of Cornelius Jansenius, which the Pope and bishops have condemned—a doctrine which is not that of St. Augustine, whom Jansenius has ill explained, and is contrary to the true meaning of that great doctor." The community of Port-Royal refused to sign, in spite of Bossuet's persuasions and severe pressure from the government; and four bishops were willing to sign only with a reservation that they believed themselves to owe nothing more than "respectful silence" to a decision of the Church in matters of fact. They were about to be deposed, when Clement IX came to the pontifical throne in 1667. After complicated negotiations the new Pope managed to arrange a compromise (1668); and the cessation of hostilities, which lasted for 34 years, was known as the Clementine Peace.

During this period the Jansenists strengthened themselves in a number of dioceses and in some religious orders, insisting especially upon strictness in the administration of the sacraments. Their whole attitude, in fact, moral, dogmatic, and political, had many points of resemblance to that of the English Puritans of a generation earlier. On Arnauld's death, in 1694, the former Oratorian Quesnel (q.v.) succeeded to the leadership. The controversy once more revived in an acute form, with the celebrated "Case of Conscience," by which the Jansenists subtly endeavored to make their doctrines appear approved. Clement XI, however, reiterated the disapproval of his predecessors in 1703 and by the bull *Vineam Domini* of 1705. The French parlements, among the legal minds of which Jansenism found many supporters, refused to accept the brief *Universi Dominici* by which, in 1708, the Pope condemned Quesnel's *Réflexions morales;* and the weak character of Cardinal de Noailles, Archbishop of Paris, gave them courage. Louis, who persistently disliked them as preventing the realization of his ideal of perfect unity in church and state, asked the Pope definitely to put an end to these confusions. After two years' further investigation Clement XI issued the constitution *Unigenitus*, which condemned 101 propositions taken from Quesnel's works. Cardinal de Noailles and 15 other bishops made difficulties about its reception; the universities of Paris, Rheims, and Nantes declared against it; the parlements protected the Jansenists; and after the death of Louis XIV the Regent, the Duke of Orléans, took a dubious position. In 1717 Cardinal de Noailles appealed from the bull "to a better-advised Pope and a general council," and several bishops joined him, constituting the party of the Appellants. When he died, after making his submission, in 1729, they gradually lost strength, and not even the miracles supposed to have been wrought by the deacon Pâris (see Convulsionaries) could restore them to their former position. Their spirit, however, remained active up to the Revolution and showed itself especially in the war against the Jesuits. It spread to some extent in Germany and Italy and had its influence on the ecclesiastical innovations proposed by the Emperor Joseph II.

As an organization, it was able to prolong its existence only in Holland, where, at the beginning of the eighteenth century, a formal schism arose. In 1723 the chapter of Utrecht undertook to restore the extinct archbishopric of that city, and they have maintained a succession ever since, claiming this to be the Church of Holland and creating also bishops of Haarlem and Deventer. After the Vatican Council of 1870 they entered into relations with the Old Catholics (q.v.) and consecrated the first bishop of the new sect.

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JANSENIST. See Jansenism.

JANSE'NIUS (Latinized form of Jansen, *Dutch pron.* yän'sen), Cornelius (1585–1638). A Dutch theologian, who gave his name to the Jansenist school. He was born near Leerdam in the Netherlands and made his studies at Utrecht and Louvain, partly under the guidance of the Jesuits, whose society he thought of entering, but was discouraged by them. During his theological studies in the college founded at Louvain by Adrian VI he came under the influence of Jacobus Jansonius, an ardent supporter of Bajus (q.v.), and became intimate with Duvergier de Hauranne (q.v.), better known as the Abbé de Saint-Cyran, whom he followed to Paris and to Bayonne. He came back to Louvain in 1617 as head of the new Dutch College of St. Pulcheria, and acquired much influence as a teacher. In concert with Saint-Cyran he agitated reforms in the Church, especially in the administration of the sacraments, and a discussion of the doctrine of grace which was to have far-reaching consequences. In 1636, on the nomination of Philip IV of Spain, he was made Bishop of Ypres and died there two years later, in good standing and apparently unconscious of the results which were to follow the publication two years later of his great work, *Augustinus, seu Doctrina Sancti Augustini.* Consult Van den Peerenboom, *Cornelius Jansenius septième évêque d'Ypres, sa mort, son testament, ses épitaphes* (Bruges, 1882), and Callawaert and Nols, *Jansenius* (Louvain, 1893). See Jansenism.

JANSON, yän'son, Kristofer Nagel (1841–). A Norwegian novelist, born at Bergen. He studied theology at the University of Christiania and afterward interested himself in the advancement of popular education, improving his own by sojourns in Italy. From 1882 till 1892 he was minister to a Unitarian congregation of his countrymen in Minneapolis, Minn., and became editor of the Norwegian periodical, *Saamanden*, published there. He returned to Norway in 1892. Besides poems, his publications include numerous novels, such as: *Fraa Bygdom* (1866); *Han og ho* (1872); *Marit Skjölte* (1868); *Torgrim* (1872); *Fraa Dansketidi* (1875); *Den Bergtekne* (1876), translated into English as *The Spell-Bound Fiddler; Gjorde hun ret?* (1910); the historical novels *Sara* (1891); *De Fredlöse* (1894); *Liv* (1897); *Ensom* (1903); *Alv Pave* (1904); *Bondefortællinger* (1908); and various dramas, among them *En Kvindeskjæbne* (1878). A collection of his *Digte* was published in 1911.

JANSON, zhäN'sôN', Paul (1840–). A Belgian advocate and politician, born at Herstal. He first made himself conspicuous by his speeches on social reform topics delivered at the labor unions in Liége and elsewhere, and in 1877 he was sent to Parliament, where he went at once to the front as a debater, and the following year was made a member of the Liberal cabinet. Afterward he joined some deputies of the Extreme Left in the formation of a radical party, claiming an extension of the suffrage, thus making a split in the Liberals. They reunited in 1889, after M. Janson had been out of Parliament for five years, and he once more began to agitate for universal suffrage. His efforts were finally successful; in 1893 universal suffrage was established. In 1900, as member for Brussels, he reëntered the chamber, after an absence of six years, to take up the struggle for an equal suffrage, and he was active in the Congo debates in 1906. In August, 1912, he received the title of State Minister.

JANSSEN, jăn'sen (or Jansen, or Johnson), Cornelius (1593–1664). An English portrait painter. He was probably born in London, and from 1618 was the fashionable portrait painter at court. His patronage declined after the arrival of Van Dyck, and during the Parliamentary wars he migrated to Holland. His portraits include those of Charles I, at Chatsworth; the Duke of Buckingham, at Welbeck Abbey; John Milton as a boy of 10, in private possession, London; "The Magistrates," Hague Museum. Other examples are in the museums of Dresden, Brunswick, Rotterdam, and Lille and in many English private collections. Janssen's portraits are distinguished by clear color, delicate touch, and careful finish, and by dark backgrounds that throw the flesh tints into high relief.

JANSSEN, yän'sen, Johannes (1829–91). A German historian. He was born at Xanten on the Rhine, was educated at the universities of Louvain, Bonn, and Berlin, and became a priest of the Roman Catholic church in 1860. He was also professor of history at the city Gymnasium in Frankfort-on-the-Main, and in 1880 became domestic prelate to the Pope. He was strongly ultramontane in his views. His historical works are as follows: *Frankreichs Rheingelüste* (1861; 2d ed., 1883); *Schiller als Historiker* (1863; 2d ed., 1879); *Zur Genesis der ersten Teilung Polens* (1865); *Gustav Adolph in Deutschland* (1865); *Frankfurts Reichskorrespondenz von 1376 bis 1519* (1863–66); *Zeit- und Lebensbilder* (1875; 3d ed., 1879); *Friedrich Leopold, Graf zu Stolberg* (1876–77; 2d ed., 1882). *Geschichte des deutschen Volkes seit dem Ausgang des Mittelalters* (1877–86), translated into English in 1905, is his principal work. Consult: Julius Köstlin, *Luther und Janssen* (Halle, 1883); Maximilian Lenz, *Janssens Geschichte des deutschen Volkes* (Munich, 1883); Ludwig Pastor, *J. Janssen* (5th ed., Freiburg, 1893); Mathieu Schwann, *Johannes Janssen und die Geschichte der deutschen Reformation* (Munich, 1892).

JANSSEN, Peter (1844–1908). A German historical painter. He was born at Düsseldorf, son of the engraver Theodor Janssen (1817–94), by whom he was first instructed before studying at the Academy under Karl Sohn and Bendemann. He is principally known through a series of decorative works whose monumental style and sound naturalism won him a reputation as one of the foremost historical painters of modern Germany. He became professor at the Düsseldorf Academy in 1877 and its director in 1895, and was elected a member of the Berlin Academy in 1885. His more important mural paintings include: "The Colonization of the Baltic Coast" (1872), in the Exchange at Bremen; "The Myth of Prometheus," in 12 compositions, in the second Cornelius Room of the National Gallery in Berlin; "Seven Momentous Episodes in the History of Erfurt" (1882), Town Hall, Erfurt; "Human Life," "Imagination," "Beauty," and "Nature," in the Aula of the Düsseldorf Academy. Of his oil paintings, the "Denial of Peter" is in the Academy at Philadelphia; the "Infancy of Bacchus" (1882) excited great admiration at the International Exhibition in Munich; and "Walther Dodde and the Peasants of Berg before the Battle of Worringen, 1288" (Düsseldorf Gallery), a composition of great dramatic power, containing many life-size figures, was awarded the great gold medal in Berlin in 1893.—His brother, Karl (1855–), a sculptor, born at Düsseldorf, was a pupil of the Academy in his native city, where, after studying at Rome, he was appointed professor in 1893. His chief works include the monument to the Kaiser at Düsseldorf, and "Woman Hewing Stone," in the National Gallery, Berlin.

JANSSEN, zhäN'säN', Pierre Jules César (1824–1907). A French astronomer, born in Paris. Chosen to report upon natural phenomena in different parts of the globe, he went to Peru in 1857 to locate the magnetic equator, and to Italy (1861–64) to take observations of the solar spectrum. The thesis he wrote for his degree of doctor of science, *L'Absorption de la chaleur rayonnante obscure dans les milieux de l'œil*, made a sensation in 1860. For several years he made a specialty of sun eclipses, and in 1870 he escaped from besieged Paris in a balloon, so as not to miss the Algerian obscuration. As the result of his observations of the solar eclipse at Guntoor, India, in 1868, he announced, almost simultaneously with Lockyer and independently of him, that the solar prominences could be studied without a spectroscope, thus opening up a fruitful field of investigation. The year 1874 found him in Japan, watching the transit of Venus, and the following year he went as astronomer with the English expedition to Siam. In 1875 he was put in charge of the Meudon Observatory, which he had been instrumental in establishing and where he collected his solar photographs in his *Atlas de photographies solaires* (1904). In 1891 he began his ascents of Mont Blanc, which resulted in the erection of the observatories there. He published volume i of the *Annales de l'observatoire de Meudon* (1896).

JANSSENS, Abraham, called Janssens van Nuyssen, yän'sĕns vän noi'sen (1575–1632). An eminent Flemish painter, born in Antwerp, where, at the age of 18, he became the pupil of Jan Snellinck. He was admitted as a master into the Guild of St. Luke in 1601, was its dean in 1606–07, and then visited Italy. A contemporary of Rubens, he ranks next to him among the Flemish masters of the seventeenth century, especially as a colorist, and occasionally surpasses him in the correct drawing of his figures. Torchlight and other artificial effects were treated by him with exceptional skill. Of his biblical, allegorical, and mythological subjects there are in the Antwerp Museum a "Madonna," an "Adoration of the Magi," and "Scaldis" (an allegorical representation of the river god of the Scheldt); in the Brussels Museum, "Old Age Resting on Faith and Hope"; in the Cassel Gallery, "Diana and Nymphs Watched by Satyrs"; in the Berlin Museum, "Vertumnus and Pomona" and "Meleager and Atalanta"; and in the Vienna Museum, "Venus and Adonis" and "Day and Night." His finest productions, however, are to be seen in the churches of Flanders, notably an "Entombment" and "Madonna with Saints," in the church of the Carmelites at Antwerp, and an "Ecce Homo" and "Descent from the Cross," in the cathedral of Saint-Bavon at Ghent.

JAN'UA'RIUS, Saint, or **SAN GENNARO**. A martyr of the Christian faith under Diocletian, and patron saint of Naples. He was Bishop of Benevento, and according to the legend suffered martyrdom by beheading at Puteoli. His day is September 19. His body is preserved at Naples in the crypt of the cathedral, and in a chapel of the same church are also preserved the head of the martyr and two phials (*ampullæ*) said to contain his blood. This blood is affirmed to possess the property of becoming liquid when brought near the head. Should it fail to do so, the event is considered a bad omen by the people. The alleged miracle has commanded much interest, though the phials have never been opened for scientific examination. Consult Cavenne, *Le célèbre miracle de S. Janvier* (Paris, 1909), which, although somewhat uncritical, is a good account.

JANUARY. See Month.

JA'NUS. An ancient and important Roman god, whose name was invoked at the beginning of all religious ceremonies. Regarding the etymology of the name and its original meaning, two theories are prominent. One considers it a formation from the root *dju, djav, djev*, by the addition of *-an, djav-an;* as we have *Ζεύς* and *Ζάν* in Greek, so, in this view, we have *Iovis* and *Ianus* in Latin; but while in Greek the differentiation in form was not sufficient to lead to the growth of two separate divinities, among the Romans the separation was complete. He is thus the god of the light and heaven, a masculine counterpart to Diana (q.v.), a sun god according to some. This theory of the origin of the name Janus certainly agrees well with the high place of this deity among the gods and with many features of his cult. The other view connects the name of the god with *ianua* (Lat., house door from the street) and considers him as the god of the entrance and the door, whether of city or house, as Vesta is the goddess of the hearth. This is in accordance with the nature of many Roman gods and explains the peculiar nature of the special shrine of Janus, the *ianus geminus* which formed an entrance to the Forum, at the northeast end. This shrine was simply two parallel arched gateways connected by side walls and furnished with gates. The tradition of later times declared that King Numa Pompilius had built the shrine and ordained that the gates should be closed only in time of peace, and that only once (in 235 B.C.) between Numa and Augustus, who closed them three times during his reign, had such a time been known. If the custom really existed from early times, its origin is probably to be sought in the belief that the Ianus Geminus was the entrance to the sacred hearth, the centre of the city, and that it would be a bad omen to close these gates upon the absent warriors. All doors and gateways were under Janus's protection. Janus is preëminently a god of the beginnings and was therefore invoked at the opening of each prayer. The beginning of the day was sacred to him. To him as well as to Juno offerings seem to have been made on the first day of each month, and his festival, the Agonium, on January 9, was the first of the Roman religious year. The *rex sacrorum* was the special priest of Janus and therefore stood at the head of the Roman priests. (For a different view of the *rex sacrorum*, consult Bessie R. Burchelt, "The Divine Character of the *Rex Sacrorum*," in the *Classical Weekly*, viii, 33–37.) The double-faced head of the god appears on the Roman *as* (q.v.) of the early coinage, and it is possible that this is the earliest representation of the god. In later times his image, with the double face, was set up under the arch in the Forum. Janus, though so ancient and important in the ritual, seems to have played but a small part in the popular religion; his cult is not proved to have existed in early times outside of Rome, and votive inscriptions in his honor are very rare. There are traces of a goddess Jana, the feminine parallel to Janus, but she never became prominent in the state religion. Some ancient authorities apply the name Janus to a King Janus who had a citadel on the Janiculum (q.v.). Consult: Linde, *De Jano Summo Romanorum Deo* (Lund, 1891); Fowler, *The Roman Festivals* (London, 1899); Wissowa, *Religion und Kultus der Römer* (2d ed., Munich, 1912).

JANUS GEM'INUS. See Janus.

JANUS QUAD'RIFRONS, Arch of. An arched passage in the Forum Boarium (q.v.) at Rome. It has four façades and was surmounted by a second story, now destroyed. It is about 40 feet square and 50 feet high; the arches are 33 feet high and 17 wide. Its erection is assigned to the time of Constantine, and it appears to have served as a sort of exchange.

JANVIER, jăn'vĭ-ā, Margaret Thomson. See Janvier, Thomas Allibone.

JANVIER, Thomas Allibone (1849–1913). An American story-writer and historian, born in Philadelphia, of Provençal descent. With a public-school education he began newspaper work in his native city in 1870 and continued it till 1881. In 1878 he married Catharine Ann Drinker, a lady of literary interests and ability. He spent several years in Colorado and in New and old Mexico, sojourns which provided inspiration and material for much of his literary work. From 1884 to 1894 he lived in the Washington Square district of New York, for three years was in Provence, and for another three in England. The fruit of his residence in New York was his *Color Studies* (1885), skillfully and charmingly written tales of artist life, originally published in magazines as the "Ivory Black Stories." In France, Janvier became a warm friend of Mistral and was made an honorary member of the Félibrige society. Besides *Color Studies* he wrote: *The Mexican Guide* (1886); *The Aztec Treasure House* (1890); *Stories of Old New Spain* (1891); *The Uncle of an Angel, and Other Stories* (1891); *An Embassy to Provence* (1893); *In Old New York* (1894); *The Women's Conquest of New York* (1894), in which the suffrage movement is fictitiously presented; *In the Sargasso Sea* (1898); *The Passing of Thomas, and Other Stories* (1900); *In Great Waters* (1901); *The Christmas Kalends of Provence* (1902); *The Dutch Founding of New York* (1903); *Legends of the City of Mexico* (1910); *From the South of France* (1912), short stories; *At the Casa Napoleon* (1914), which contains a memoir by Ripley Hitchcock.

Janvier's sister, **Margaret Thomson Janvier** (1844–1913), was born in New Orleans. Under the pen name Margaret Vandergrift she wrote many juveniles, among which are to be noted: *The Absent-Minded Fairy, and Other Verses* (1884); *The Dead Doll, and Other Verses* (1900); *Under the Dog-Star* (1900); *Umbrellas to Mend* (1905).

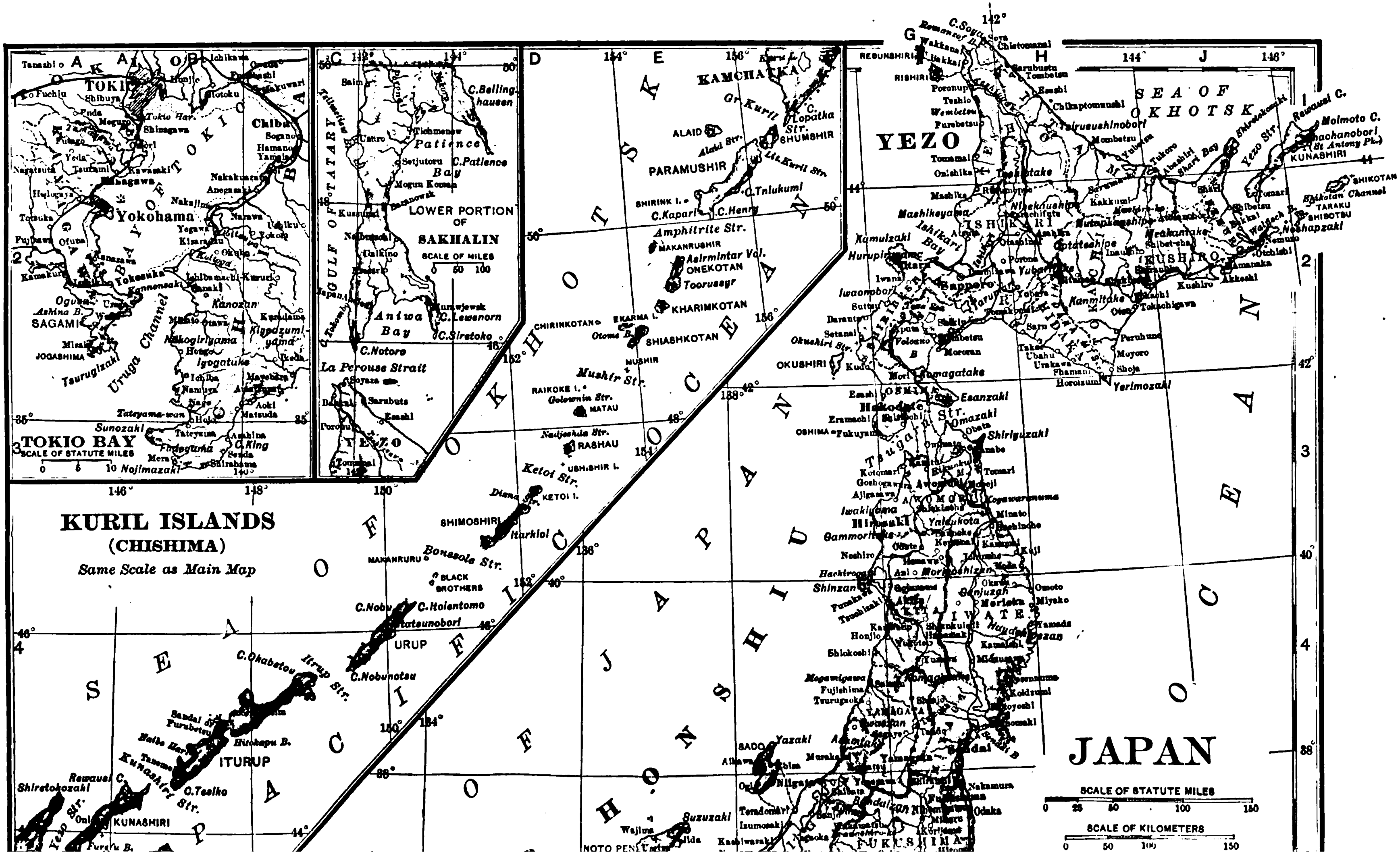
JA'OK (name among the Kamchadales). A large, edible sculpin (*Myoxocephalus jaok*), which is one of the most characteristic and useful fishes of both shores of Bering Sea. It is about 2 feet long, reddish above and white beneath. It is very active, has extraordinary tenacity of life, and is extensively caught and smoke cured by the Kamchadales, who call it jaok, and Koriaks, whose name for it is i laal, while the coast Russians call it ramsha.

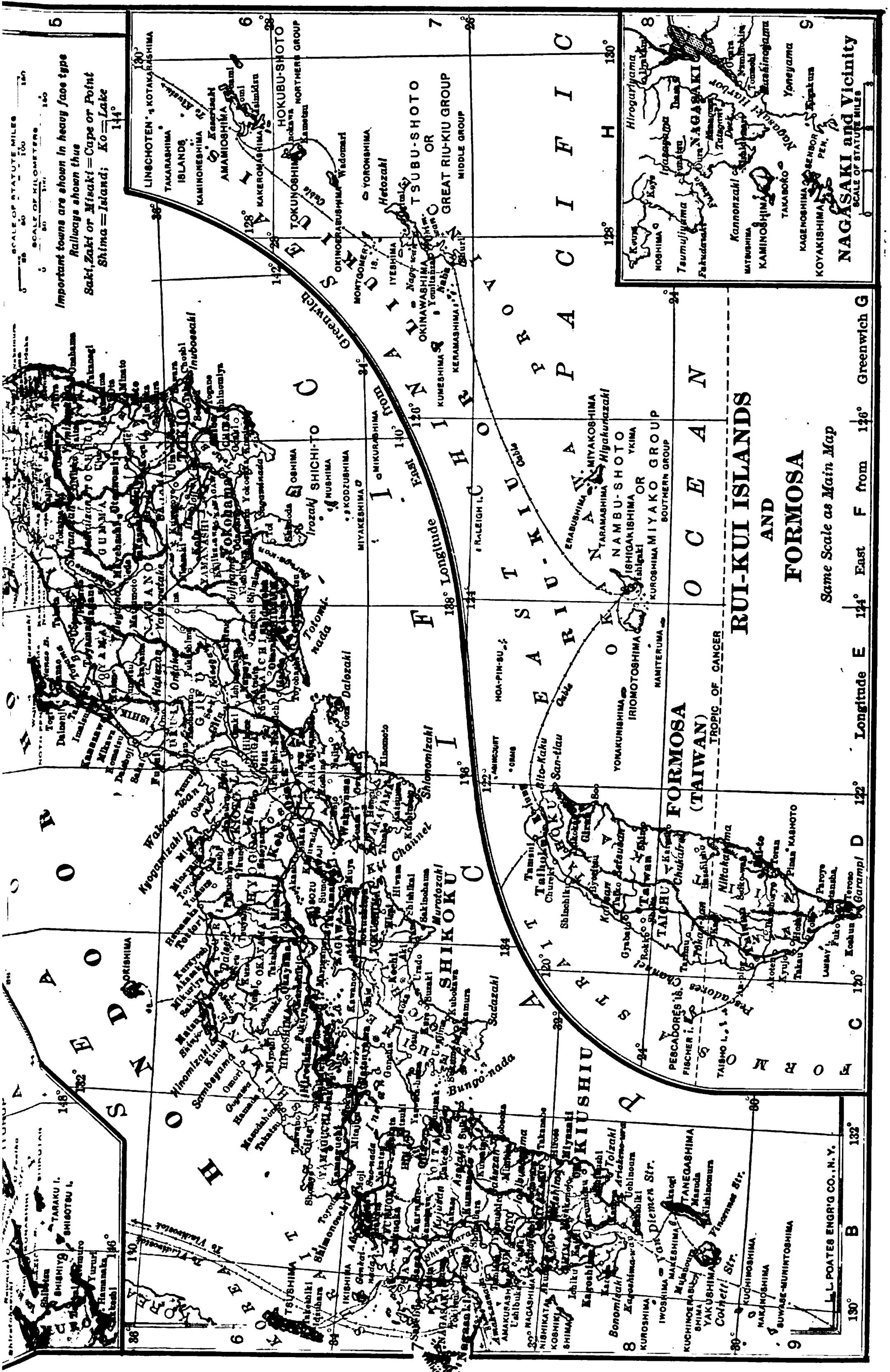
JAPAN', in Japanese **NIPPON'**, or **NIHON'**. An empire consisting of a chain of islands lying along the east coast of Asia and extending from lat. 21° 45′ N. to 50° 56′ N. and from long. 119° 18′ to 156° 32′ E. It is separated from the Philippines by Bashi Channel; from China by Formosa Channel, 70 to 100 miles wide; from Korea by Broughton Channel, less than 25 miles in width; from the Russian portion of the island of Sakhalin by the fiftieth parallel, N. lat.; and from Kamchatka by the Kurile Strait; while the wide, somewhat secluded Sea of Japan lies in the embrace of the main island and Yezo, on the south and east, and of the east coast of Korea and the maritime province of Siberian Manchuria on the west and north.

Japan is the name by which the country is known to foreigners, but in Japan itself Nippon or Nihon is used, sometimes with the syllable Dai (great) prefixed and occasionally Te Kokŭ (empire, or imperial) suffixed to it, so that in its most expanded form the name is Dai Nippon (or Nihon) Te Kokŭ (i.e., the empire of great Japan). The name Nihon seems to have been adopted about the year 670. Down to that time Yamato was the name, from the province adjoining Kyoto, in which Jimmu Tenno (660 B.C.) and the early mikados ruled. The Chinese have long known the country as Jih-pun-Kwoh, (sun-origin kingdom).

The islands of which the Empire is composed are said to number nearly 4000, but of these only about 500 are inhabited or have a coast line of over one *ri*, or about 2.44 miles. The remaining islands are mere rocks, sometimes covered with vegetation, as, e.g., the 808 tiny islets of the Bay of Sendai, collectively known as Matsushima, or Pine Islands. The chief islands are five in number: 1. The Hondo, or Main Island, sometimes also designated as Honshu, or the Mainland, and formerly but incorrectly named Nippon, a name which can be applied only to the whole country. With its adjacent small islands, it has an area of 87,426 square miles. In shape it is an irregular crescent, its concave side forming the southeast boundary of the Sea of Japan. Its greatest breadth is less than 200 miles. It is separated from Yezo, on the north, by Tsugaru Strait, 10 miles in width (through which runs a strong current from the Sea of Japan), and from the eastern part of Shikoku, on the southwest, by Kii Channel. 2. Shikoku, with an area of 7083 square miles, lying south of the western part of Hondo, and separated from it by the beautiful landlocked but shallow channel, studded with islets, known to foreigners as the Inland Sea, but to the Japanese by different names in different parts of the length. 3. Kiushu, with an area of 15,703 square miles, separated by the narrow Strait of Shimonoseki from the western point of Hondo, and lying to the west of Shikoku, from which it is divided by Bungo Channel. 4. Yezo, an irregular four-cornered island, with an area of 36,570 square miles, including the Kurile Islands, lying north of the main island, with one long arm or corner stretching north to Siberia and one reaching northeast to the Kurile Islands. 5. Formosa (q.v.), with an area of 13,944 square miles, lying off the coast of China. The other considerable islands or groups of islands are Sado and Oki, in the Sea of Japan, with a combined area of 468 square miles; the island of Awaji, lying off the mouth of Osaka Bay and between the main island and Shikoku, area 220 square miles; and Iki and Tsushima, lying between Kiushu and Korea, and having an area of 318 square miles; lastly, the Seven Islands, which are found off the promontory of Idzu. Korea, which was annexed to Japan in August, 1910, is separately treated.

CHIEF ISLANDS	Adjacent islands	Coast line in miles	Area in sq. miles
Hondo	167	5,930.12	87,426.00
Shikoku	74	1,628.29	7,083.00
Kiushu	150	4,506.33	15,703.00
Sado	....	130.05	336.44
Oki	1	185.36	130.35
Awaji	1	89.76	220.00
Iki	1	90.89	51.39
Tsushima	5	503.17	266.30
Total, Old Japan	....	13,063.97	110,748.09
Loo-choo group, 55 isl'ds	....	768.84	834.40
Bonin group, 20 islands	....	174.65	26.79
Total, Japan proper	....	14,007.46	111,607.28
Yeso	13	1,533.56	30,502.00
Kurile group, 32 islands	....	1,496.23	6,153.25
Formosa	29	859.63	13,944.00
Pescadores	47	98.67	85.33
Southern Sakhalin	....	....	13,253.00
Korea	....	....	84,738.00
Total, Japanese Empire	488	17,995.45	259,671.47


JAPAN
SCALE OF STATUTE MILES
0 25 50 100 150
SCALE OF KILOMETERS
0 50 100 150
YEZO
SEA OF OKHOTSK
SEA OF JAPAN
HONSHIU
PACIFIC OCEAN
OCEAN
KURIL ISLANDS
(CHISHIMA)
Same Scale as Main Map
TOKIO BAY
SCALE OF STATUTE MILES
0 5 10
LOWER PORTION OF SAKHALIN
SCALE OF MILES
0 50 100
GULF OF TATARY
La Perouse Strait
Aniwa Bay
Patience Bay
KAMCHATKA
PARAMUSHIR
ITURUP
URUP
KUNASHIRI
Tsugaru Str.
Hakodate
Sapporo
Yokohama
TOKIO
Sendai


RUI-KUI ISLANDS
AND
FORMOSA
Same Scale as Main Map
NAGASAKI and Vicinity
SCALE OF STATUTE MILES
Important towns are shown in heavy face type
Railways shown thus
Saki, Zaki or Misaki = Cape or Point
Shima = Island; Ko = Lake
SCALE OF STATUTE MILES
SCALE OF KILOMETERS
PACIFIC OCEAN
SEA OF JAPAN
HONDO
SHIKOKU
KIUSHIU
FORMOSA
(TAIWAN)
TROPIC OF CANCER
PESCADORES IS.
FORMOSA STRAIT
EAST CHINA SEA
RIU-KIU
TSUBU-SHOTO
OR
GREAT RIU-KIU GROUP
MIDDLE GROUP
HOKUBU-SHOTO
NORTHERN GROUP
NAMBU-SHOTO
OR
MIYAKO GROUP
SOUTHERN GROUP
LINSCHOTEN'S ISLANDS
OKINAWASHIMA
SHICHI-TO
TOKIO
YOKOHAMA
KOREA STRAIT
TSUSHIMA
Van Diemen Str.
Colnett Str.
Vincennes Str.
Bungo-nada
Kii Channel
Longitude East from Greenwich
C
D
E
F
G
H
B
5
6
7
8
9
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The first three of the large islands, viz., Hondo, Shikoku, and Kiushu, with their adjacent islands, together with Sado, Oki, Awaji, Iki, and Tsushima, with their adjacent islands, constitute Oyashima, or Old Japan. With the 55 islands of the Loo-choo group and the 20 of the Bonin group added, there is formed Japan proper—Yezo, with its 12 adjacent islands, the 32 islands of the Kurile group, Formosa, the Pescadores, and Korea, with their numerous adjacent islands, being regarded merely as colonial possessions.

The preceding table shows the different constituent members of the Empire—the chief islands with the number of adjacent islands, the length of coast line of the various groups, and their area in square miles.

Topography. Japan is a land of high mountains and deep valleys, with many small plains. Its scenery is, in the main, pleasing rather than grand or sublime, rounded heights clad with forests, or with the verdure of a remarkably luxuriant vegetation predominating, though a large number of lofty, more or less shattered and craggy volcanic peaks are found.

The level land lies chiefly along the lower courses of the principal rivers, or consists of small extents of coast lowlands or coastal plains, or of plateaus and gentle slopes along the feet of the mountain ranges. The most extensive plains are those which border the Ishikari and Tokachi rivers in Yezo or stretch along the seashore at Kushiro and Nemuro. In the northeast section of Hondo is the Oshu plateau, watered by the swift-flowing Kitakami and extending over portions of four provinces. In the central region is that of the Tonegawa, or plain of the Kwanto, which spreads into the provinces of Musashi, Kodzuke, Hitachi, and Shimosa. Next comes the Kisogawa, which forms part of Mino and Owari. The most extensive of the littoral plains is found in Echigo, along the lower waters of the Shinano River. In the Five Home Provinces are several comparatively wide plains along the Yodo and Yamato rivers and their feeders, while in Shikoku flat lands lie along the Yoshino River and in Kiushu along the Chikugo. In Formosa a plain 20 miles wide, expanding towards the south, lies between the mountains and the western coast.

In general, the mountains follow the trend of the land itself, and the main chains send off various smaller ranges which run parallel or branch out from them, often descending to the sea and forming bays and harbors capable of sheltering large ships. It is at these points that the greatest mountain masses and the most imposing scenery are found. In Formosa, also, the great backbone of the island extends from north to south, several of its peaks exceeding in height those of Japan proper. Beginning with the volcanic elevations of the Kurile group, which form a line of 32 stepping stones from Kamchatka to the island of Yezo, a range of trachytic and basaltic rocks is intersected near the centre of Yezo by a loftier and more massive chain composed of granite and old schists, from Cape Soya on the north (a continuation of the Sakhalin system), the highest peak of which is the Tokachi, with an elevation of 8200 feet. Farther on towards the southwest this volcanic Kurilian Range merges into the west coast range from Cape Soya and is marked by some remarkable volcanoes, the most noted though not the highest of which is Koma-ga-take, or Foal Mountain (a name of common occurrence in Japan), with a height of nearly 4000 feet. Branching into two lines after the long western arm of the island rounds Volcano Bay, these mountains reappear on the main island in two parallel chains. One, the northern schist range, separates the valley of the Kitakami River from the Pacific; the other, the main chain, continues towards the southwest, forms the backbone of the island until it meets the great complex of massive intersecting ridges which inclose the plateau of Shinano (2550 feet above the sea), and occupies the central portion of the main island where it is widest. It sends out important branches and continuations southeast through the Hakone Range into Idzu; southwest through Yamato and Shikoku to Kiushu; and westerly through the centre of Chugoku to Shimonoseki, forming in its course the dividing line between the group of provinces known as San-yo-do and that called San-in-do.

In this central mountain mass, which covers the provinces of Kaga, Ecchu, Hida, Shinshu, Koshu, and part of Kodzuke, are found the loftiest peaks of Japan proper. They also offer the grandest scenery and hence are frequently called the Japanese Alps. The principal summits are Haku-san in Kaga, an extinct volcano, with a height of 8920 feet; Yari-ga-take, 10,000 feet, in Hida; Gohonsha, the highest peak of the Tate-yama Range, 9500 feet; Koma-ga-take, 10,384 feet; and scores of others. Farther north in the Nikko Range of Shimotsuke is Shirane-san, 8580 feet; Nantai-san, 8150 feet; and others, each as a rule sacred to some deity and consequently much visited by pilgrims. Snow covers most of them in winter, but, except in a few cases, as, e.g., Haku-san and the peaks of the great mountain masses of Shinano and Hida, it disappears before the end of summer. The Fuji Range is the most noted of the Japanese mountains, and Fujiyama, "the Peerless," 12,395 feet, the highest peak on the islands, is not far from Tokyo. The remarkable grace of the mountain has given it an eminent place in Japanese decorative art. About its base the land is cultivated up to 1500 feet, from this point a grassy moorland extends to 4000 feet, then forests to 8000 feet, and above this is a wide stretch of old ejected lava and ash. Even on Fujiyama only patches of snow remain from year to year. The *toge*, or passes, by which these mountains are crossed are comparatively low, owing to the fact, as Rein points out, that (1) the mountain masses of primitive crystalline rocks and schists do not rise very high, and that (2) the volcanic formations, which have in so many places burst through and overlain them, seldom form long or very high ridges.

It is said that there are in Japan, which is of volcanic origin, 170 volcanoes, most of them, however, regarded as extinct, some merely quiescent, but scores still active, sending forth smoke and steam, or serving as landmarks at night by their fiery glow. Among the more famous volcanoes still reckoned as active are Asama-yama, in Shinano; Koma-ga-take and several others, in Yezo; Chacha-take, in one of the Kuriles; Shirane-yama, in the Nikko Range; Mihara-yama, on Oshima or Vries Island, one of the Seven Islands, lying off the promontory of Idzu; and Suwa-shima in Loo-choo. As late as 1888 Bandai-san (q.v.) was in a state of violent eruption. On Jan. 11, 1914, the volcano of Sakur-shima on the island of Kiushu after a quiescent period of 130 years broke out violently and thousands of lives were lost. Earthquakes are of frequent occurrence, and even in comparatively recent times some have been very disastrous. The line of greatest seismic disturbance extends from Loo-choo through Kiushu to the northeast. On Oct. 28, 1891, occurred an earthquake, felt in six provinces; 7279 persons lost their lives, 17,393 were injured, and over 200,000 buildings were utterly destroyed.

Thermal springs and solfataras, some of them with curative properties, are exceedingly numerous. In Japan proper, the former, chiefly sulphur, are said to occur in 388 different localities, and almost all are much patronized by the natives. The chief are Kusatsu and Ikao, in Kodzuke; Yumoto, at the foot of Shirane-yama, in the Nikko Range; and Enoyu, on Kirishima-yama, in Kiushu. Chalybeate springs, both hot and cold, are also found. The solfataras are well exemplified by the O-jigoku and Ko-jigoku, or Great and Little Hells, of the Hakone Range.

Hydrography. Owing to the mountainous character of the country and the narrowness of the islands, Japan cannot boast of long rivers, no part being farther distant from the sea than about 100 miles. Yet the country is abundantly watered. Every valley has its stream or its streamlet, and one of the chief charms of the scenery is the rush of the numerous waters, and the beauty of its waterfalls, while the swiftness and torrential character of many of the streams cutting their way through deep rocky gorges, present grave problems to the engineer engaged in railway construction or bridge building. The largest river in the Empire is the Ishikari, in Yezo, which flows into the Sea of Japan, after a course of 275 miles. On the main island the three great *kawa*, or rivers, are the Shinano-gawa, the Tonegawa, and the Kisogawa. The Shinano rises in the province of that name, has a course of 215 miles, and flows northwest into the Sea of Japan. The Kitakami, in the northeast, has a course of 146 miles and flows southeast into the Bay of Sendai. The Tonegawa rises in Kodzuke, traverses the plain of Kwanto, and enters the Pacific near Tokyo, after a course of 177 miles. The third great river is the Kisogawa, which pursues a devious course from Shinano and falls into the Pacific. Another important river is the Ten-riu, which rises in Lake Suwa and flows south for 135 miles to the Pacific. Other rivers are the Sumida, flowing through Tokyo into the Gulf of Tokyo, and the Yodogawa, the outlet of Lake Biwa, which enters Osaka Bay. They are all swift, and spread out greatly when they leave the mountains. The streams are rarely navigable for any but the smallest vessels, being very shallow for most of the year; in late summer the torrential rains cause them to rise 15 feet or more, and they become impetuous.

Japan has many lakes, more remarkable for their beauty than their size. Several shallow sheets of water are found in Yezo, and along both the east and the west sides of Hondo or Main Island, but they are of little consequence as lakes and have little beauty. The largest and most noted is Lake Omi, better known as Biwa-ko (ko = lake) from a fancied resemblance in shape to the Chinese guitar (*p'i-pa*). It lies in the centre of the Province of Omi, at no great distance from Kyoto (q.v.), and is much visited by tourists on account of its "Eight Beauties." It is 37 miles long and 12 miles wide at the widest part and has an area nearly equal to that of Lake Geneva in Switzerland. Northeast of this, in the Province of Shinano, is Suwa Lake, the source of the Ten-riu-gawa, 2600 feet above the level of the sea. In winter it is covered with ice more than a foot thick. Farther north, in the Nikko Mountains, is the beautiful Chuzenji, at the foot of Nantai-san, with an area of nearly 18 square miles, being the highest lake in Japan, 4375 feet above sea level. It is of great depth and contains no fish. Farther north still is Inawashiro, near Bandai-san, with an area of perhaps 90 square miles, and situated about 1840 feet above sea level. It abounds in fish and is said never to be frozen over. Its outlet is the Ikano-gawa, which falls into the Sea of Japan near Niigata. Another well-known lake is that of Hakone, about 50 miles west of Yokohama. It is said to fill the crater of an ancient volcano, at an elevation of 2300 feet above sea level. It is about 10 miles long and is of unknown depth. Its outlet is the Haya-gawa, and by a tunnel at one end it supplies water for irrigating the rice fields of 17 villages on the plain to the west.

Climate. Stretching as the Empire does through nearly 30 degrees of latitude, climatic conditions vary widely in different parts. In the Loo-choo group subtropical conditions prevail; the heat is great, and snow and ice are never seen. In the Kurile Islands, on the other hand, snow and ice never entirely disappear, the sea freezes over in winter, and it is sometimes possible to pass from one island to another on the ice. Omitting Loo-choo, the Bonin Islands, and Formosa, there is scarcely a part of the country that is entirely free from snow in winter. It is heaviest in Yezo and along that part of the main island which lies between the great mountains (which form its backbone) and the Sea of Japan; and so deeply does it cover the country that in many places, especially north of the Shinano, Hida Range, the inhabitants have recourse to continuous porticoes or snow sheds along the streets to afford passageway. To the south and east of this region the snow is somewhat less heavy, and the winter is milder, owing to the influence of the warm current known as the Kuro Shiwo (q.v.). Seldom does more than a few inches of snow fall in Tokyo and Yokohama, though Fujiyama, only 60 miles distant, is covered to its base. The winter temperature hardly ever goes below 22° F., and there are not more than three or four frosty days during the whole winter. Kiushu, Shikoku, San-yo-do, and Tokaido are warm, and snow seldom lies except on the higher mountains. The wind is northerly and dry and the air bracing. The exceptional conditions which prevail in Yezo are due largely to the cold current —the Oyashiwo—and to the strong northeast winds which sweep down upon it from the ice fields of Siberia.

The southwest monsoon brings with it a hot, moist summer. The rainfall is great, and the heat is considerable, much greater than in corresponding latitudes in Europe and America. The rainfall is heaviest in June and September. During September, at the end of the summer heat, tropical cyclones, called typhoons, occur and cause great damage to property, especially to shipping. The annual fall in Yokohama is about 70 inches; in Nagasaki, 71⅓; in Tokyo, 65.4; in Hakodate it is only 57.2. It is the great humidity which some of these figures imply, coupled with a temperature which may rise, though rarely, in summer to 95° F. as in Tokyo and Yokohama, that causes so much discomfort and sends to the mountain all who can get away. Yet, as compared with many places on the mainland of China, Japan is a very pleasant summering place. There is a well-equipped and well-managed weather bureau, with many meteorological stations.

Flora. The flora of Japan is exceedingly rich in variety, and its luxuriance is in keeping with the warmth and the moisture of the Japanese summer. In 1876 Franchet and Savatier enumerated no fewer than 2743 species of phanerogamous and the higher cryptogamous plants, distributed among 1035 genera. Since then the number has been increased to over 3000. The ferns are represented by 43 species, the sedge family by 168, and the Ericaceæ by 76. In the plains one meets with pimpernel, the lily of the valley, bluebells, eyebright, various kinds of violets, the gladiolus, or sword lily, and many species of iris, hemerocallis, etc., as well as the characteristically Japanese *Lespedeza striata*, or Japan clover, with its minute purple flower, now well known throughout the southern part of the United States, having been introduced accidentally about 1840, perhaps in tea chests. In April the hillsides of Japan are ablaze with azaleas.

Among trees, evergreens, of which there are said to be 150 varieties, predominate. Savatier enumerates 41 species of Coniferæ alone. One of the most characteristic of Japanese trees is the sugi, or Japanese cedar (*Cryptomeria japonica*), which sometimes attains a height of 150 feet. It is a favorite in temple grounds and is frequently seen lining the highways, but more particularly the approaches to some sacred place, as along the great avenue (nearly 50 miles in length) leading to the tomb of Iyeyasu at Nikko (q.v.). Another beautiful temple tree is the icho (*Salisburia adiantifolia*), or maidenhair tree. A fine specimen, said to be 1000 years old, stands near the entrance to the temple of Hachiman at Kamakura.

The cypress and the yew, firs of different kinds, the box, the holly, and the myrtle abound. The mulberry tree, the tea plant, the lacquer tree (*Rhus vernicifera*), the camphor tree, and many species of bamboo not only add to the beauty of the landscape, but are of great economic value. Among deciduous trees are the oak (20 species), the maple (24 species), beeches, alders, the ash, the horsechestnut, the birch, and 17 species of willow. The hinoki, or fire cypress, is much prized in the making of lacquer ware; the keyaki, or Japanese elm (*Planera japonica*), in cabinetwork; and the box for combs. The hajimo-ki, or wax tree, grows profusely on the hillsides and round the edges of the cultivated fields in Kiushu, and the coco tree, the banyan tree, and the banana flourish in Loo-choo and the Bonins. The bud and leaves of the ornamental kiri, or *Paulownia imperialis*, form the badge of the Mikado. Among the climbing and twining plants are the *Hydrangea cordifolia*, several species of climbing magnolia, whose coils run from right to left, the *Akebia quinata*, the *Clematis japonica*, and the wistaria, which blossom in June. The plum blossoms in February; the cherry in April. The tree peony flowers about the first of May, lotuses fill the castle moats and canals in August, and in November the chrysanthemum is the occasion of perhaps the greatest of the Japanese flower festivals. Of the fruits the grape is the best, and those from the Province of Kai are most esteemed. (See Kofu.) The kaki, or persimmon, is a very luscious fruit, and the oranges are the most characteristic of Japanese fruits. The pear, apple, peach, and fig are mostly of inferior value. All attempts at introducing English and other pears have invariably proved unsuccessful; but the apple is now cultivated with good results in Yezo. The strawberry has been successfully introduced. The loquat comes in April.

Fauna. This is not so rich as the flora, yet the country can boast of at least 150 species of mammals, 359 of birds, 300 of reptiles and batrachians, a great number of kinds of fishes, of which 358 species were described by Siebold. Also over 1200 species of mollusca are mentioned in the books; and, according to the best authorities, 26 kinds of sea urchins and 12 species of starfishes are found. At the head of the mammals stands the red-cheeked saru, or monkey (*Inuus speciosus*), which lends its name as a qualifier to the name of many a place and plant, and whose flesh is esteemed a delicacy. The saru is sometimes found as far north as the forty-first parallel of latitude, where in winter snow often lies 15 to 20 feet deep, and the thermometer registers many degrees below zero. Among the 10 species of cheiroptera peculiar to the country are several bats, and of the insect eaters are the mogura, or Japanese mole, and several kinds of shrew mouse. The hedgehog is unknown. The carnivora include three species of bear—the common black bear (*Ursus japonicus*), the red bear, also called the great bear (*Ursus ferox*), much reverenced by the Ainos, and the ice bear (*Ursus maritimus*), an involuntary visitor brought to Yezo and the Kuriles by the Arctic current. The tanuki, or badger, sometimes called the bamboo bear, whose flesh is eaten, occurs everywhere. The tiger is known only from Chinese literature and art, while the wolf of the country, known as yama-inu, or mountain dog, is not numerous. The fox is found everywhere and, like the monkey and the badger, plays a very important part in folklore and the superstitions of the country. (See Fox.) Among the fur-bearing animals are the marten, the fish otter, the sea otter, and the itachi, or weasel. Rodents are numerous and include two species of ki-nedzumi (tree rats) or squirrels, two flying squirrels, and rats, which are so numerous and so much of a pest that the Japanese government has offered rewards for their extermination. The common house mouse is unknown. Hares exist everywhere. Two species of deer are found.

The avifauna includes many species which are familiar in the Old World, showing very slight differences in color and size, as, e.g., the robin, the cuckoo, the woodpecker, the ice bird, the hoopoe, and the jay. The cuckoo, however, is not very common. The sparrow, the house swallow, and the thrush are the commonest and most numerous. Eagles, falcons, and kites are seen, as well as the woodchat, the magpie, and the Korean raven. There are several species of singing birds, but the uguisu, or Japanese nightingale, and the lark are the most conspicuous. Blackbirds and the singing thrushes are absent. There are two species of kiji, or pheasant: the *Phasianus versicolor*, called yama dori, or mountain bird, by the Japanese, and the copper pheasant, or *Phasianus sæmmerringi*. Wild pigeons abound, and quail and snipe are fairly abundant. The wild duck and geese also furnish many a shot for the sportsman. The crane and the silver heron are the most popular of the waders. The former, the symbol of longevity, has a prominent place in Japanese art. The latter faithfully keeps company with the peasant in the rice fields all summer.

The mamushi (*Trigonocephalus blomhofi*) is the only poisonous snake of the eight species found in Japan proper. Another, called the habu, exists in Loo-choo. The mamushi, skinned and cooked, is used as a nerve-strengthening food. Four sea snakes make their way to the southern islands in summer. Of the three species of lizard, one, the ya-mori, or house warden, frequents dwellings and is an expert flycatcher. Marine turtles, of which there are three species, are most numerous in the Bonin Islands. The kame, a river tortoise, another symbol of longevity, is one of the four supernatural creatures of Chinese and Japanese mythology. It is found as far north as Yezo, but is not common. There are several species of frogs and toads, but they differ little from those found in Europe and America. The mountain newt (*Lacerta japonica*), when boiled and dried, enriches the Japanese pharmacopœia as a vermifuge. The most remarkable of this class is the giant salamander, extinct elsewhere, but still found in the rivers. It is sometimes captured for the sake of its flesh.

Insects are exceedingly numerous, both in species and individuals, and include many beautiful beetles, 137 species of butterflies, and over 100 species of moths. There are several large silk moths, but only two are used in the silk industry. Except in the mountains, the mosquito is very troublesome and rivals the flea in persistency, but not in numbers. Flies are found everywhere, but are most numerous in the silkworm-breeding localities. Ants are numerous and troublesome, and crickets, grasshoppers, and cicadas abound. Scorpions exist, but are said to be nonpoisonous. The seas teem with fish, the tai and the maguro being highly esteemed for food. Salmon and trout are found in the northern rivers.

Geology and Mineral Resources. Soon after the opening of the country the government seems to have realized the desirability of exploiting its mineral resources, which were supposed to be very extensive and of great value. To this end geologists and mining engineers were engaged abroad, and to them—Pumpelly, Lyman, and others—as well as to the explorations and observations of later geologists and travelers—Richthofen, Milne, Naumann, Rein, and Wada—the world is indebted for its still very imperfect knowledge of the geology of Japan.

The backbone of the country consists of metamorphic rocks—gneiss, crystalline schists, serpentine, and marble—which are discovered everywhere in great masses, but are best studied in Shikoku. Overlying these are thick Paleozoic strata—probably of the Silurian or Devonian formation—consisting of clay slate, graywacke, quartzite, and limestone. The Carboniferous formation is represented by limestone and by the coal measures of Yezo. The Permian seems to be entirely unrepresented in Yezo, but Rein seems to have found indications of the occurrence of the lower New Red Sandstones on the main island. Mesozoic strata of the Jurassic formation exist in Kaga, while the Cretaceous formation is exemplified by the coal measures of Takashima, by the gray-white granular and micaceous sandstones of that vicinity, and in Yezo by certain Cretaceous clays. Tertiary and Post-Tertiary conglomerates, sandstone, clay slate, peat, stratified volcanic tuffs rich in coal, lignite, and fossil plants, fringe the country in many places. The oldest eruptions were of granite, which is very widespread.

Japan is not specially rich in minerals, contrary to the views expressed by early geologists. Iron and coal are the most plentiful; next come copper and antimony, gold, silver, lead, sulphur, and petroleum. During 1911 the production was: gold, 10,000 pounds; silver, 300,000 pounds; copper, 580,000 tons; lead, 4500 tons; iron, 60,000 tons; coal, 17,632,000 tons; sulphur, 57,000 tons. The Japanese seem to have been entirely unacquainted with the useful or even the precious metals until after contact with the Chinese and the incoming of the arts, sciences, letters, and religion from China. Silver was first discovered and worked in the year 674, copper in 698, and 10 years later, in imitation of the Chinese cash, a copper coinage was introduced, a fact commemorated in the name of the reign in which this occurred—*Wa-dō* (Japanese copper) (708–714). Gold was discovered in 749. The lodestone had become known somewhat earlier—in 713.

Coal is found in many places, from Formosa to Yezo. The best is that of Takashima (where the seams are 14 feet thick and extend under the sea), Karatsu, Miike, and other places in the island of Kiushu; at Kelung (q.v.) in Formosa; and at Horonai in Yezo. In 1912 the output (exclusive of that of Formosa) was 19,639,000 tons against 3,200,000 tons in 1891. As already indicated, most of it belongs to the Tertiary formations. The coal is of good quality, is much used by the steamships in the Pacific trade, and is also sold at the coaling stations as far south as Hongkong, where it begins to meet the competition of Australian and East Indian coals. Its steaming value is about 75 per cent that of the Welsh coals, which are the standard for steaming purposes on the ocean. Iron is found chiefly as magnetic iron ore, and as iron sand exists in nearly all the provinces. In 1912 the production amounted to approximately 60,000 tons. Copper seems to have been plentiful from the very first. It is said that from 1609 to 1858 no less than 533,332,000 pounds were exported by the Dutch. The product in 1912 amounted to about 140,000,000 pounds. Three silver ores are found, besides galena. The first discovery of silver was on the island of Tsushima, halfway between Kiushu and Korea. It is now worked in many places in Shikoku, and in Hondo from Settsu to Mutsu in the north. In 1912 the product amounted to 39,996,000 mommé (120 mommé = 1 pound).

Gold exists chiefly (1) in the alluvial sands and gravels of Osumi, in Kiushu, and at several places in Yezo; and (2) in auriferous quartz in Satsuma, Koshin, Rikuchiu in Hondo, and at Aikawa, on the island of Sado, in the Sea of Japan. In 1912 the total product was 1,373,000 mommé. Several gold mines are also worked near Kelung in Formosa. The other mineral products in 1912 were: lead, 11,010,000 pounds; antimony, 176,000 pounds; sulphur, 121,000,000 pounds; iron pyrites, 167,000,000 pounds. The sulphur supply is practically inexhaustible. Petroleum is obtained at Nagaoka and many other places, but the output is far from being enough to supply the needs of the country. In 1912 it amounted to 58,100,000 gallons. The total mineral production of Japan amounted in 1912 to $65,000,000. It is interesting to note that petroleum was discovered by the Japanese in the Province of Echigo as early as 668. Marble, granite, and other building stones exist in different parts of the country, but are at present little used in building. The number of persons engaged in mining in 1911 was 226,308, of whom 145,412 were engaged in the coal mines, 72,614 in metalliferous mines, and 8282 in nonmetalliferous mines.

Fisheries. The Japanese depend on the farmer and the fisherman for their food supplies. The former provides them with the indispensable rice, and the latter with the fish which invariably goes with it. In 1911 about 1,500,000 persons were engaged in fishing and the industries allied to it. The waters, both fresh and salt, teem with fish of every kind, from the whitebait to the bonito and the sturgeon. There is probably no country in the world where the markets are supplied with a greater abundance or variety. The mackerel family is perhaps the largest, both in species and catch; the tai, or golden bream, is perhaps the most prized. The salmon abounds, especially in Yezo, where there are many salmon-curing establishments. The flounder, sole, turbot, trout, haddock, perch, pike, shad, and halibut are all plentiful. In 1912 the value of the take of fresh fish for the entire Empire was over $51,700,000, and of all fish and fish products $78,100,000 against $39,890,000 in 1900. There are a great number of establishments in different parts of the country for the hatching and rearing of fish, and in 1911 there were 71,369 culture beds, aggregating about 475,000,000 square yards. Various kinds of fish oil are made. On the coasts of Yezo immense numbers of a kind of herring or sardine are caught, and the residue, after expressing the oil, is packed and shipped south to the other islands as manure. The value of the dried fish and fish oil, fish guano, and other manufactured products in 1912 was $48,250,000. The salt used in fish curing and in Japan generally is made by evaporating sea water and then leaching and boiling. The area of beds in 1912 was 14,586 acres, and the value of the salt produced was $5,840,000.

Agriculture. In Japan, as in China, the farming class has always held an honorable position in the community, ranking next after the barons and their military retainers, who were the scholars of the country, and taking precedence of the mechanic and the merchant. Sixty per cent of the population is directly engaged in agriculture.

The soil is largely the product of old shales, granite and trachytic eruptions decomposed by the action of the weather, and is not naturally fertile. It is only by the most careful manuring that it can be made productive, a result to which also the warmth and moisture of the climate contribute largely. As already indicated, the greater portion of the country is occupied by mountains, largely covered with forests or tall, rank grass, leaving only certain narrow river stretches and plateaus and more or less circumscribed plains for cultivation. It is therefore not surprising that the portion devoted to agriculture is only 17 per cent of the total area. The forests covered 46,300,000 acres in 1913, 42.1 per cent being owned by the state. Rice (of which there are 217 varieties) is the staple food and the most important crop, and rice or "wet" land is worth about three times as much as other arable land. For its cultivation, irrigation is needed, and even the hillsides and gullies are terraced, the water being ingeniously conducted from one terraced plat to another. In 1913, 7,411,000 acres of rice land were under cultivation and yielded 248,463,000 bushels. Much of this is consumed in the manufacture of sake, the beverage of the country, the excise duty on which returns a large revenue to the government. In 1912 over 212,850,000 gallons were produced. The crops next in importance are barley and wheat, the area and the product of which in 1912 were as follows: barley, 1,465,000 acres, yielding 48,012,000 bushels; wheat, 1,216,013 acres, yielding 25,688,000 bushels. The other products are pulse, millet, corn, buckwheat, potatoes of various kinds, all sorts of vegetables, and the soy bean, which is said to approach more nearly in its chemical composition to animal food than any other known vegetable; one-fifth of its weight is fat and nearly two-fifths nitrogenous matter. In 1912, 17,900,000 bushels of this bean were produced. Tobacco (introduced by the Portuguese before 1612, for in that year its production and use were forbidden), cotton (known to the Japanese 150 years before the Chinese), sugar, hemp, and indigo are grown, and great attention is given to silk and tea. The tea plantations in 1913 covered 73,500 acres and produced 71,013,000 pounds of tea.

Since the abolition of the feudal system, the soil has been mostly held by those who work it, the average holding being about one acre. The land tax was transformed in 1873 from a tax in kind (grain), proportioned to area, into a money tax proportioned to the value of the land. It was 2½ per cent of the assessed value until 1899, varied between 3.3 and 5 per cent—according to the class of land—during 1899–1903, and was raised to 5.5 per cent since the war with Russia. In the budget for 1913–14 it was estimated at $37,501,000, or about 35 per cent more than the estimate from customs.

Until comparatively recent years flocks and herds were not reared, such cattle as were found being used merely as beasts of burden. Milk, butter, and cheese were unknown, and beef was never eaten. This was due partly to the influence of Buddhist teaching and partly to the fact that the grasses of Japan, except perhaps in Yezo, are not adapted for grazing. Since the Restoration (see paragraph on *History*) the government has established numerous experimental farms, under skilled foreign superintendence, including the breeding of horses and cattle and the rearing of sheep. These efforts have been only partially successful. The use of animal food is, however, extending, and dairying has been introduced. In 1912 there were 1,399,498 cattle, 1,581,000 horses, 308,970 hogs, 101,475 goats, and 3308 sheep.

Manufactures. China is the original home of the highly perfected arts of lacquer work, fine ceramics, chasing and inlaid work, ivory, bone, stone, and wood carving, in most of which Japan now excels its ancient tutor. The most authoritative writers on the industries of Japan agree that the Japanese have regarded China as their model in all these departments for many centuries. They have developed great aptitude for imitating these art products and but very little independent creative power. The fact that Japan now far surpasses its old master in the most extended branches of art handicraft is to be attributed to this very gift of imitation, and most of all to the awakened sense of beauty in nature and art that has been applied to worthy and useful ideas as models which originated on foreign soil.

In the latest development of the industries of Japan the same limitations are observed. It has been shown thus far that while the Japanese artisan has great manipulative skill and can turn out indifferent sewing machines, typewriters, and many other foreign mechanisms with an imitative art in superficialities that amounts almost to genius, still for the fundamental elements of his industry he must yet depend on the assistance of foreigners. The national character in its recent approximation to Western civilization is what it always has been, imitative, not originative; and is almost wholly devoid of that rude energy of initiative which constitutes such a marked difference between the inhabitants of the East and the West. This detracts nothing from the merit and value of the industries for which the Japanese are famous. In woodwork their buildings lack much in solidity, adaptation, and elegance. It is not as carpenters and architects that they are distinguished, but as joiners, turners, and wood carvers. The frames of their window panes, the wainscoting of the walls of many of their temples, and numerous other works are samples of fine and careful joinery. They make many small wooden wares, excellent in design and utility. Comb cutting is a large house industry, small-toothed combs of the wood of several evergreen trees being used in the native toilet.

Lacquer work takes the first place among the Japanese art industries. In no other branch of art have the Japanese so completely disengaged themselves from their Chinese masters, displayed so much fancy and taste, and won such eminence among all civilized peoples. The lacquer tree is grown chiefly in Hondo or the main island, between the parallels of latitude 35° and 40° north. Its sap is distinguished from all other varnishes by its greater hardness, its high lustre preserved for centuries, and its resistance to agencies that destroy other resinous varnishes. The lacquer varnish is applied to wooden or metal articles. Every layer must be thoroughly dried and polished before another is placed. A fine piece of work, with 20 to 30 coats of lacquer, may be many months in making. The antiquity of the industry is attested by some lacquer boxes in one of the temples where they have been kept, it is said, in a state of perfect preservation for 17 centuries. Among the choicest exhibits of the museums in the Occident are Japanese lacquers fixed on copper, or more frequently on the wood of the *Pinus retinospora*, and ornamented with gold, silver, or mother-of-pearl. The best specimens have a metallic lustre, can scarcely be scratched, and are almost indestructible. In 1912, 17,813 persons in 6234 families were engaged in the manufacture of lacquered ware. The value of their output was $4,520,000.

Much broken pottery has been discovered in mounds in Japan dating from prehistoric times, but it was only after contact with China through Korea, and the introduction of Korean potters, that Japan began to progress in an art which has made it renowned. The most famous of the pottery wares are the choice imitation porcelains known as Old Satsuma, which have become extremely rare. All Japanese pottery, however, is traced back to Sedo in Owari, and from this circumstance Sedomono has become the general name for all Japanese ceramic ware. The number of ceramic works was never greater than at present, the art having spread into many new districts. Wares serving the humblest utilities or expensive products for the collections of connoisseurs are produced, many of them being remarkable for richness of color and originality of floral and animal designs. Many of the potters' villages are famous, though they do not differ in appearance from ordinary hamlets. Each workshop comprises the members of a single family, every member watching in his turn over the baking of the materials in the public oven of the commune. The chief manufactories for the finest porcelain ware are at Arita in the Province of Hizen, in Kiushu, where the best clays are found in abundance. It was here that Gorodayu Shonsui set up his first kiln on his return in 1520 from China, where he had learned the art of porcelain making. In 1899 the number of factories engaged in pottery and porcelain making was 4604, the number of persons employed 19,454, and the value of the product $2,934,000; in 1912 the number of factories was 5657, of persons 34,654, and the value of the product $8,272,000.

In the making of works of art in bronze, a single artist casts the metal, does the chasing, colors with oxides, incrusts the bronze with precious metals, coral, or pearls, and produces the work from start to finish. The Japanese do not share the predilection of the Indian people for brass utensils, though the few they make are ornamented with great skill and care, but they excel in bronze manufactures.

The Japanese excel in the manufacture of some kinds of paper, of which they use a larger quantity in proportion to population than most other nations. It is made from various species of plants, including the pulp of the paper mulberry, and is used not only for printing and painting, but for many other purposes. Their handkerchiefs, table napkins, windowpanes, the panels forming the movable partitions of their houses, are made of paper. They cover with paper the cushioned stools used as pillows, and paper garments coated with vegetable wax are worn in rainy weather. The papers of Japan always show a yellowish tint when made of the purely native materials and in the purely native way, and in this respect are inferior to the pure white products of the West; but printing paper as white as any made in the United States or Europe is produced in quantity. All attempts to imitate certain of the Japanese native papers have failed. In 1899 Japanese paper was manufactured in 65,514 families, yielding an output valued at $8,272,754; in 1912, in 53,474 families, the value of the product was $10,130,000. In addition to this there was produced in 33 factories 324,072,000 pounds of "European" paper valued at $10,020,000.

The Japanese also excel in wickerwork and in a great variety of straw objects, such as straw toys and mosaics. Ivory is fashioned into curious boxes and cabinets and embellished with carved reliefs involving miscroscopic work. Ivory carvings, large and small, distinguished for technical skill and inspiration, are sold in all Western countries. The artistic skill of many of the natives, however, has been impaired by the production of great quantities of cheap articles to meet the foreign demand for the artistically worthless articles sold under the name of Japanese china and other cheap products.

Spinning and weaving have for centuries been the most important native industries. The art of weaving heavy linens and silken fabrics and their brocades, interwoven with gold and silver thread, was long ago developed to a high degree; their products still form admirable hangings and festive robes. But the modern brocades are often colored with imported aniline dyes and have neither the brilliancy nor the quality of the old fabrics. Spinning and weaving for everyday utility have always employed most of the textile workers. The returns for 1895 showed that there were then over 1,000,000 weavers, and in nearly every house in rural Japan the spinning wheel and loom were kept going from morning till night. A great revolution, however, was already far advanced. About 1880 an enormous impetus was given to the erection of cotton spinneries, with all modern appliances, and to-day homespun yarn is almost unknown in the Japanese markets. Not only is the domestic market fully supplied by the great spinning mills but large quantities of yarn are produced for exportation. The value of cotton yarn exported in 1913 was $35,493,000, of which a large proportion went to China for use in the hand industry of weaving cotton cloths. Osaka is the great centre of manufacture both of yarns and cotton goods. It has been compared to Manchester on account of the many spinning mills and other large textile interests centred there. In 1890 the value of raw cotton imported into Japan was $2,672,000; in 1913 it was $116,755,000. In 1894 the number of cotton spinning mills was 45, representing a capital investment of $6,627,000, with 476,000 spindles, producing 121,054,000 pounds of yarn, and employing 8229 male and 26,923 female workers. In 1904 the number of cotton spinning mills was 74, the invested capital was $17,280,000, the number of spindles was 1,306,000, the yarn produced was 286,235,000 pounds, and the number of employees was 10,967 males and 52,115 females. In 1911 the number of mills was 90, the employees 41,531 men and 707,350 women, machine looms 89,003, hand looms 638,412, value of output $69,875,000 cotton goods and $15,091,000 mixed silk and cotton. The exportation of cotton goods has become an important feature of the trade of Japan, the value of cotton shirtings amounting to $16,645,000 in 1913, and of miscellaneous cotton goods the exports are steadily increasing, especially to China, where cloths from Japan have to a considerable extent displaced those formerly drawn from the United States. Japan draws from the United States a large proportion of the raw cotton used in her mills, though in years of high prices of the raw material a larger share is drawn from India, whose short-staple cotton sells at a less price than the United States product. The following table, giving the value for a series of years of the silk, cotton, and other textile manufactures, shows the progress of these industries:

1886	1896	1903	1911
$14,240,000	$55,492,100	$68,867,000	$136,900,000

Silk is also manufactured to a great extent by modern machinery. About half the raw silk is retained at home for the manufacture of the characteristic silk fabrics worn in the country. Large quantities of the exported silk fabrics are now dyed in France and the United States before being placed on the market. Reeled silk, however, is the chief silk export. Silkworm eggs on cards are also exported to Italy.

The policy of Japan has long been to build up a strong navy and a large merchant marine without dependence on foreign yards. Shipbuilding is therefore a large industry, especially at Nagasaki, the open port of Kiushu, where vessels of from 1000 to 8000 tons' burden are turned out. There are also large yards at Kawasaki, Osaka, Ishikawa-jima, and Uraga. They are all equipped with the best appliances for the building of steel and iron ships and have fully demonstrated their ability to turn out ocean-going craft and river steamers of the highest standard. A number of steamers on the Yang-tse River were built in Japan. The merchant marine of Japan on Jan. 1, 1913, was 1981 steamers above 20 tons with a tonnage of 1,430,629; sailing vessels 6443, tonnage 447,307. In many directions Japan is striving to increase her manufactures of iron and steel goods. This necessitates considerable imports of metal, as the local iron-mining industry is not yet adequately developed.

For some years the Japanese have been carrying on the manufacture of many European and American articles that were not even known in their country when it was opened to foreigners. They manufacture enormous quantities of matches, which they sell in China, Hongkong, India, Singapore, Siam, Australia, and other markets. The value exported averages about $6,000,000 per annum. About 30,000 clocks are made in Kyoto, Osaka, and Nagoya every month and sold at very low prices. Saddlery, glassware, umbrellas, brushes, boots and shoes, rugs, mathematical and surgical instruments, patent medicines, watches, canned fruits, vegetables, and condensed milk are among the articles they are producing with the aid of Western patterns and processes. The wages of the labor employed in these numerous industries are advancing and, while at much lower rates per hour than in Europe or America, are, when judged by the quantity and quality of the product, about as high as those paid in the Western world.

The following tables illustrate the growth of Japanese industry:

1. NUMBER AND KIND OF FACTORIES AND EMPLOYEES

	1904	1912
Factories run by motors	4,000	8,710
Total horse power	223,930	1,102,782
Factories not run by motors	5,234	6,409
Total number of factories	9,234	15,119
Operatives employed, male	207,951	348,230
" " female	318,264	515,217
Total number of operatives	526,215	863,447

2. PRINCIPAL BRANCHES OF FACTORY INDUSTRY IN 1912

	Total number	Nonmotor factories	Total number of employees	Female employees
Textile factories..........	8,119	3,003	513,187	446,283
Raw silk (included in above)	3,056	471	216,833	205,154
Machine and iron..........	1,260	312	89,651	4,655
Chemical................	1,537	929	75,304	24,992
Ceramic (included in above)	588	761	28,233	4,294
Food and drink...........	1,849	1,111	43,960	7,929
Brewing (included in above)	1,020	744	22,283	723
Metal refining............	41	1	17,128	1,251
Printing and publishing....	545	123	20,981	3,331
Wood and bamboo work...	589	218	15,157	3,611

3. THE WEAVING INDUSTRY

	1894	1904	1912
Weaving houses......	660,444	397,912	427,636
Machine looms.......	....	15,636	111,656
Hand looms..........	....	605,209	621,383
Looms, total number..	820,585	620,845	733,039
Operatives, male......	48,175	23,671	36,742
" female....	895,416	598,052	660,956
" total no...	943,591	621,723	697,698
Val. of total production	$35,555,000	$64,389,000	$152,562,000

4. QUANTITY AND VALUE OF PRINCIPAL MANUFACTURES. (000 omitted)

	1894	1904	1912
Raw silk (lbs.)..........	10,731	22,000	21,400
Cotton yarn (lbs.)........	121,054	286,235	561,000
Matting.................	$1,806	$3,458	$5,345
Porcelain and earthenware	$1,595	$3,619	$8,250
Lacquered ware..........	$1,292	$2,229	$4,500
Matches................	$2,231	$5,848	$7,060
Straw plait.............	......	$2,394	$3,987
Japanese paper..........	$4,014	$6,745	$10,130
European paper.........	$1,139	$4,882	$10,020
Sake (gals.)............	157,609	143,497	212,000
Beer (gals.)............	556	5,296 (1905)	9,345
Soy (gals.)..............	52,761	73,809 (1905)	111,800

Government Industrial Activity. The government of Japan has not only promoted the development of national industry by the establishment of special commissions of scientists and experts, the payment of shipping subsidies, the advancement of capital obtained through foreign loans at a lower rate of interest than can be obtained at home, and in many other ways, but it is also the greatest employer of labor in the country. It owns shipbuilding yards, factories for the manufacture of arms, railway and telegraph material, clothing, etc. On Dec. 31, 1912, the total number of government factories employed 141,500 operatives and laborers. The Tokyo military arsenal gave employment on the above date to 17,856 persons. Other important establishments are: the Osaka military arsenal, employing 10,900 persons; the Kure naval arsenal, with 22,276 employees; the Yokosuka naval arsenal, with 9924 employees; and the Sasebo naval arsenal, with 5340 employees. The three factories belonging to the government railway works bureau, situated at Shimbashi, Kobe, and Nagano, employed 4935 persons, and the tobacco factories belonging to the Bureau of Monopolies, 28,664. And while the government's industrial activity during 1904–05 was excessively large, owing to the necessities of war, it should be borne in mind that its taking over of the chief railway lines of the country (see below, *Nationalization of Railways*) still further extended the scope of its industrial activities.

Commerce. The domestic trade has been greatly stimulated by the rapid growth of railways, which render it easy and cheap to distribute the products of the factories throughout the country and particularly in the main island. This fact is causing some decline in the household industries, which, however, still supply a part of the common needs of the people. In the foreign trade the imports have exceeded the exports since 1895, owing to the large railway equipment and other material which Japan has purchased abroad in the development of its many enterprises. About one-third of the imports come from other parts of Asia and two-thirds from Occidental lands. Asiatic countries buy from Japan about one-third of her exports, the remainder being sent to Western countries. The accompanying table showing the total foreign trade (excluding the precious metals) for a series of years will give an idea of the rapid development of foreign commerce (one yen equals $0.498).

The rapid industrialization of Japan is reflected in the increase, both absolute and relative, of the export of manufactured commodities.

Trade between the United States and Japan has grown rapidly in recent years. The imports into the United States from Japan were, in 1901, $29,229,443 and, in 1914, $107,355,847. The exports from the United States to Japan were, in 1901, $19,000,640 and, in 1914, $51,205,520. The principal imports into Japan from the United States are flour and wheat, raw ginned cotton and kerosene oil; also engines, locomotives, electrical apparatus, and other kinds of machinery, and leather goods. Nearly all the kerosene oil and most of the lubricating oil and paraffin wax come from the United States. A part of the raw cotton is obtained from British India, the price of whose short staple is usually about 10 per cent lower than that of American cotton. Raw cotton, however, is largely imported from the United States, especially in years of low prices, and the shipments of 1913 were 375,000 bales valued at $25,022,000 against 92,556 bales in 1910 valued at $6,583,000. The United States supplies nearly all the flour, but Australia competes in supplying wheat. The United States leads in shipments of alcohol, leather, telephones, lumber, and steel and iron materials for bridges

	1909	1910	1911	1912	1913
	Yen	Yen	Yen	Yen	Yen
Imports.................	394,198,840	464,233,800	513,805,700	618,992,270	729,431,644
Exports.................	413,112,510	458,428,990	447,433,388	526,981,840	632,460,213

and buildings. Hongkong, Germany, and the Philippine Islands supply nearly half the sugar imported, the remainder coming chiefly from other Asiatic countries, especially Java. The United States buys more than three-fourths of the tea exports and is the heaviest purchaser of raw silk, which constitutes more than one-half of the entire imports from Japan. Japan's cotton yarn and tissues are sold in neighboring countries of Asia. The exports of coal, principally to China and Hongkong, are important, and large quantities of coal are supplied to ocean steamers for bunker use.

The value of the imports from and exports to the leading countries in 1912 and 1913 was as follows:

FOREIGN TRADE BY COUNTRIES

COUNTRIES	Imports		Exports	
	1912	1913	1912	1913
	Yen	Yen	Yen	Yen
Australia	12,791,985	14,943,145	8,628,934	8,637,974
Belgium	9,087,488	9,448,023	3,080,150	3,705,592
British India	134,741,613	173,173,831	23,648,074	29,873,414
China	54,807,116	61,023,038	114,823,727	154,660,128
France	5,421,103	5,828,992	43,871,410	60,229,619
Germany	61,075,924	68,394,798	13,487,589	13,131,709
Great Britain	116,146,973	122,736,970	29,791,898	32,869,675
Dutch India	19,063,191	37,389,257	4,343,389	5,148,686
Hongkong	881,550	1,294,749	28,712,905	33,621,978
Philippine Islands	5,276,234	7,647,833	5,535,497	6,283,556
European Russia	73,619	40,943	2,540,737	4,897,420
Asiatic Russia	669,098	750,846	3,542,176	4,271,413
United States of America	127,015,757	122,408,361	168,708,896	184,473,182

The value of the chief articles of Japan's special import and export trade in 1912 and 1913 was as follows:

FOREIGN TRADE BY ARTICLES

IMPORTS	1912	1913	EXPORTS	1912	1913
	Yen	Yen		Yen	Yen
Rice	30,192,437	48,472,446	Cotton yarn	53,680,797	70,997,538
Wheat	4,409,938	12,351,029	Cotton shirtings	25,759,635	33,557,999
Wheat flour	1,722,140	1,781,660	Raw silk	150,324,733	188,884,182
Soy beans	10,222,235	10,388,487	Silk waste	10,546,185	10,465,427
Sugar	16,046,903	36,762,302	Silk manufactures	26,882,129	34,882,279
Raw cotton	200,824,203	233,599,185	Coal	20,323,831	23,670,886
Wool	16,333,968	15,998,149	Matches	12,043,538	11,864,514
Woolen yarn	8,225,051	10,091,604	Copper	24,920,637	28,183,904
Oil cake	27,479,953	39,418,165	Camphor	2,826,754	2,235,784
Petroleum	12,433,180	11,053,807	Tea	13,466,552	10,077,421
Iron	35,600,242	33,288,861	Rice	4,382,677	4,372,113
Machinery	28,289,431	34,358,844	Earthenware	5,451,890	6,638,994
Engines and rolling stock	2,562,831	3,668,435	Straw plait	17,337,999	15,692,054
			Toys	1,898,345	2,489,843

Communications. Japan has exerted every energy for many years to improve transportation facilities throughout the country and to foreign lands. The government is not unmindful of the necessity of supplying good harbors. Yokohama, the most northerly port of first-class importance, has a naturally fine harbor that has been greatly improved by dredging. There are large dock facilities and a substantial breakwater. Yokohama transacts a very large part of the foreign business of the country. It is the centre of the silk trade. The second port in importance is Kobe, one of the centres of the tea trade and other commerce of central Japan. The principal ports utilized in the foreign trade are Yokohama, Kobe, Osaka, Nagasaki, Hakodate, Niigata, and a few minor ones. In January, 1913, Japan had in its merchant marine 1981 steamers above 20 tons and 6443 sailing vessels of the Western type (1,877,936 tons), besides 20,635 sailing vessels of the native type. There are regular lines of Japanese steamers to Europe, America, Australia, British India, China, and Korea. More than 50 steamships, including those of the United States and Canada, ply regularly between the Pacific coast ports of America and the seaports of Japan, some of them going on to Hongkong and Shanghai. Nine steamship companies have vessels in this trade, and they ply between Yokohama, San Francisco, Puget Sound ports, and Vancouver. The government grants liberal subsidies to vessels in the foreign trade. The steamship lines to the United States were greatly strengthened on the opening of the Panama Canal, and a line to the eastern coast of South America was established.

The total mileage of railway in operation in Japan in the fiscal year ended June 30, 1912, was 7067. Of this 6008 miles were operated by the government and 1059 miles by private companies. The first railway, 18 miles in length, between Tokyo and Yokohama, was opened in 1872, and now there is direct communication by rail from Awomori at one end of the main island to Shimonoseki at the other, a distance of 1132 miles, and from Moji in Kiushu, less than a mile distant, the lines run south to Kumamoto, 121 miles, and beyond. There are many branch lines, and there is a line of some length in Yezo. There were 844 miles of electric tramways in operation in Japan in 1912, with 306 miles additional under contract to be built. The post-office system is extended all over the Empire, and the telegraph and telephone have been very widely introduced, their length in 1905 being 16,468 and 3374 miles respectively.

Nationalization of Railways. In 1907 the Japanese government owned and operated about one-third of the total mileage in Japan, and the remainder was operated by private companies. The government then decided to take over the private lines with their subsidiary businesses, paying approximately $237,100,000 for these lines. In 1910 the mileage owned and operated by the government in Japan proper was 4879 miles, which had cost $303,978,000, or about $62,300 per mile. There were at that time 506 miles of privately owned road, capitalized at about $44,900 per mile. There was considerable opposition in the minority political party in Japan to the acquisition of the privately owned mileage, but this acquisition was hardly as much of a revolutionary change of policy as it was the addition of privately owned lines to already existing state lines.

The average rate of dividends of private railways in 1904—before the large government acquisition—was 8.2 per cent, and of the state railways at that time 9.4 per cent. Lines may be bought at the discretion of the government within 10 years, and the price in each case is to be a sum equal to the capitalized average net profits for the three years 1902–05. New lines and lines which have not paid dividends will be valued by a special commission, from the decisions of which appeal may be made to the Minister of Communications. Payment for cost of construction and equipment is to be made with 5 per cent 30-year bonds at face value, the bonds to be delivered to shareholders at the option of the government within five years from the date of purchase. Payment for supplies on hand is to be made, at their market value, with similar bonds. During the interval between the date of purchase and the delivery of the bonds, shareholders receive the 5 per cent interest on the bonds due to them. The relation of the actual cost of construction and equipment to the face value of the bonds varies greatly in the case of the different lines, the extremes being 34 per cent and 347 per cent. For the six largest companies the ratio of cost to face value of bonds is 40.1 per cent, 41.7 per cent, 49.6 per cent, 52.6 per cent, 87.7 per cent, and 100 per cent respectively. Eight companies will receive bonds, the face value of which is less than cost of construction and equipment; but these are very unimportant companies, only two of them having more than 50 miles of line each. The average of cost to face value of bonds for the 17 lines is 55 per cent. A separate law, similar in its provisions, empowers the government to purchase the railways in Korea, the estimated cost being about 34,000,000 yen.

In 1911–12 the state railways carried 31,501,510 tons of freight and 156,636,964 passengers, and the privately owned roads 4,506,603 tons of freight and 29,325,185 passengers.

The Japanese railways operate at about a 46 per cent ratio of expenses to gross earnings. The average freight rate per ton per mile on Japanese roads is 83 cents, and the average passenger rate per mile is 69 cents.

Banks. The banking business of the country is carried on (1913) by six great banks (one of them with 16 branch establishments), 46 industrial and agricultural banks, and 1620 ordinary banks, not including the foreign banks at the open ports. The paid-up capital of all banks was, in 1913, 592,031,296 yen, the reserve fund 211,707,667 yen, and the deposits 22,261,751,004 yen. The Bank of Japan is a government institution founded in 1882 and authorized to issue convertible notes, the paper currency of the country down to that time having been "fiat" money. There were also 480 savings banks with deposits in 1913 of 1,047,147,527 yen. Japan adopted a gold standard in 1897, and the yen, in which accounts are kept, is equal to 49.8 cents.

Money, Weights, and Measures. The yen is divided into 100 sen. The subsidiary silver coins are 5, 10, 20, and 50-sen pieces, and there are 5-sen nickel pieces, and 2 sen, 1 sen, and ½ sen of copper. The unit of weight is the kin, equal to 1⅓ English pounds, or more exactly 1.32277 pounds avoirdupois. Above that is the kwan (or kwamme), equal to 8.267 pounds avoirdupois, or 16 kwan to 100 kin. The lineal foot is divided into 10 inches and is equal to 0.9942119 English foot. For distances, 36 chō equal 1 ri, which equals 2.44034 English miles. For land measures the square chō equals 2.45 acres, and the square ri equals 5.955 square miles. For measures of capacity 1 to = 3.97 English gallons or in dry measure 1.985 pecks. The kokŭ is equivalent to 39.7033 English gallons, or 4.9629141 English bushels. The English pound and the ton of 2240 pounds are also coming into commercial use. The picul —100 kin, or 132½ pounds avoirdupois—has long been in use in the foreign trade.

Government. The government may be described as a constitutional monarchy with representative institutions based largely on German rather than on British or American models. The constitution on which it rests was promulgated by the Mikado in 1889 in accordance with his oath in 1868 to give the people representative government. In that year the dual government which had existed for centuries reached its end, and the Mikado became the de facto as well as the de jure ruler. The instrument consists of 76 articles, 17 devoted to the Emperor, 15 to the rights and duties of subjects, 22 to the Imperial Diet, 2 to the ministers of state and the Privy Council, 5 to the judiciary, 12 to finance, and 4 to supplementary rules. The Premier, or Minister President of State, presides over the Imperial cabinet. The central government consists of the Imperial cabinet, Privy Council, and the nine ministries—Foreign, Home, Finance, War, Navy, Justice, Education, Agriculture and Commerce, and Communications. There are also a court of accounts, a tribunal of administration, and the administrative bureaus for the Upper and Lower Houses. In the provincial governments division there are the prefecture of the police of Tokyo, the Department of Colonization of Yezo, the fu and ken (the three cities and 43 prefectures into which Japan proper is divided), and the Government of Formosa. Functionaries are in three grades (choku, so, and han), besides many salaried agents.

The Parliament or Diet meets annually and has control over the policy and expenditures not fixed by the constitution. It consists of an Upper and a Lower House. The composition of the Upper House is peculiar, its membership being made up of five classes: (1) princes of the Imperial family who are 25 years of age or over—they become members for life; (2) princes and marquises of 25 years of age and over—also members for life; (3) a certain number of each of the other classes of peers—counts, viscounts, and barons—over 25 years of age, elected by their own order to serve for seven years; (4) persons who are not peers, nominated by the Emperor for meritorious services to the state, or noted for scholarship—they are members for life; (5) persons over 30 years of age in each fu and ken who are among the 15 largest taxpayers, elected by the 15, and appointed by the Emperor for life. The Upper House contained 369 members in 1914. The Lower House, according to the Election Law of 1900, is composed of 379 members, or one for every 136,522 of the population in 1914.

The Emperor in reality is a mere screen behind which are a powerful group of aristocrats known as the "elder statesmen" who really control the government. It is they who advise the monarch whom to appoint to the cabinet and what policies to recommend. In the fu (first-class cities), Tokyo, Osaka, and Kyoto, and the ken, or prefectures, there are local legislatures, which have general supervision over local affairs, besides paying their own officers. Male subjects who are 25 years old, have lived a year in the voting district, and pay $5 of direct taxes are allowed to vote for members of the Lower House. The inhabitants of the Colony of Yezo and the inhabitants of the Loo-choo Islands have as yet no part in the parliamentary representation. The franchise is also withheld from functionaries of the Imperial household, ecclesiastics, police, soldiers, sailors, bankrupts, and outlaws. Deputies must be at least 30 years of age and Japanese subjects. The national trend is towards democracy, and the struggle is to secure party government and to make the ministers responsible to the Diet and not, as now, to the Emperor.

Administration of Justice. In preparation for the abolition of the extraterritoriality clause in all the treaties, a new criminal code, based on the Code Napoléon, was put in operation in 1882, with modifications suggested by the old criminal law of Japan. The code of criminal procedure was in 1890 made uniform with the code of civil procedure, according to the provisions of the law of the organization of judicial courts. The civil code, code of civil procedure, and commercial code, published in 1890, went into effect after 1893. The law of the Imperial house, Diet, and finance, laws for the exercise of local self-government, and various miscellaneous subjects, such as the statutes relating to banking and the mechanism of exchange, may also be called codes. Three kinds of crime are classified: (1) crimes against the state or to public detriment; (2) crimes against personal property; and (3) police offenses. Punishments for major crimes are death by hanging; deportation, with or without hard labor, for life or a term of years; imprisonment, with or without hard labor, for life or a term of years. Instead of the 250 crimes calling for the death penalty under the old system, there are but few mentioned which are punishable with death. The principal courts are the high court of cassation (1), courts of appeal (7), and tribunals of the first instance (49).

Finance. The revenue of the Imperial government is derived from many sources. The land tax, which from 1873 until 1899–1903 was 2½ per cent of the market value of the land, was raised after the war with Russia. It produced, in 1913–14, 75,350,000 yen; the taxes on sake and other liquors, about 89,000,000 yen; customs dues, 55,906,000 yen; income tax, 35,471,000 yen; and the receipts from government enterprises—railways, mining, postal and telegraph services, etc.—140,000,000 yen. The chief items of expenditure are (1913–14): army, 78,000,000 yen; navy, 42,000,000 yen; administration of justice, 12,300,000 yen; education, 9,500,000 yen. In 1913–14 the total revenue and expenditure—ordinary and extraordinary—was estimated at 586,807,000 yen each. The public debt stood in 1913 at 2,494,000,000 yen.

In local matters the revenue in 1913–14 was 80,613,558 yen. The revenue of the cities amounted in 1913 to 127,213,000 yen, and the expenditure to 111,970,000 yen.

Prior to 1884 the country was flooded with "fiat" paper money, which had greatly depreciated. In that year the Bank of Japan, a government institution, issued convertible notes in exchange for this depreciated currency, and by 1885 the difference in value between silver and paper had almost disappeared. The following year specie payments were resumed. In 1897 the gold standard was adopted, 74,455,735 yen in gold were coined, and the silver dollars were redeemed as far as received. The currency is now on a gold basis. From the foundation of the mint in 1870 up to 1914 the total coinage issued amounted to about 750,000,000 yen. The coins in circulation Jan. 1, 1913, were 175,090,000 yen. The note issues of the Bank of Japan amounted in 1913 to 408,376,000 yen.

Russo-Japanese War Finance. The methods resorted to by the Japanese government to raise funds for the prosecution of the war against Russia were the usual ones of imposing new taxes or increasing existing ones, diverting funds from the ordinary expenditures to war purposes, and contracting loans at home and abroad. In addition a monopoly was assumed over the salt and tobacco industries. On Dec. 28, 1903, an ordinance was published authorizing the diverting of funds under special accounts, the issuing of Treasury bonds, and the raising of temporary loans for military expenditure. The sums thus obtained amounted to 156,000,000 yen up to March 30, 1904. For the fiscal year 1904–05 the Diet voted 576,201,000 yen for war purposes, and for 1905–06 it voted 780,000,000 yen, including loans of 411,000,000 yen and 571,000,000 yen respectively. The most important special taxes imposed were those on land, sugar, income, and business, and the tobacco and salt monopolies. By the end of March, 1906, by which time all the troops had been repatriated, with the exception of two divisions in Manchuria and two in Korea, the actual outlays for the war amounted to 1,261,161,877 yen, of which sum 1,070,140,000 yen were for the army and 191,021,868 yen were for the navy. The sources of revenue to meet this expenditure were as follows:

Loans and treasury bills................yen	1,127,634,199
War taxes..............................	82,430,129
Capital funds (navy, education, and famine relief)..........................	69,311,977
Voluntary contributions................	2,279,899
Sale of state property..................	5,126,436
Other revenue..........................	5,472,912
Total...........................yen	1,292,255,552

The loans contracted at home and abroad for war purposes were as follows:

FOREIGN LOANS

AMOUNT OF ISSUE	Rate of interest	Issue price per 100 face value	Period of redemption	Date of issue
£10,000,000	6%	93½	7 years	May, 1904
12,000,000	6	90½	7 "	Nov., 1904
30,000,000	4½	90	20 "	Mar., 1905
30,000,000	4½	90	20 "	July, 1905

DOMESTIC LOANS

AMOUNT OF ISSUE	Rate of interest	Issue price per 100 face value	Period of redemption	Date of issue
yen 100,000,000	5%	95	5 years	Feb., 1904
100,000,000	5	92	7 "	May, 1904
80,000,000	5	92	7 "	Nov., 1904
100,000,000	6	90	7 "	Mar., 1905
100,000,000	6	90	7 "	Apr., 1905

Army. The rapid and progressive development of the military resources of Japan due to her war with China (1894–95), with Russia (1904–05), and to her alliance with Great Britain, signed in 1905 and renewed for 10 years in 1911, combined with her policy of secretiveness in connection with all military affairs, renders it difficult to arrive at an accurate estimate of the ultimate military resources of the nation. It is known, however, that between 1894 and 1904 Japan's fully trained force about doubled, and that this force has again doubled since 1904. At the present time (1914) she has fully realized her national ideal of the "nation in arms," adopted from the continental European countries, and no doubt could rapidly mobilize at least 1,000,000 fully trained men in addition to her regular army, and ultimately put into the field a force of between 3,000,000 and 3,250,000 men, or about 6 per cent of her total population. Her tactical organization, equipment, and methods closely follow European models, particularly that of Germany.

Administration.—The Emperor is supreme commander of the army and navy. He selects his War Minister (a general officer of the army), the chief of staff, the director of military schools, and the members of his military council. The 19 divisions are organized in and recruited from definite territorial districts, which constitute the administrative and command units. In addition to the line troops there are a number of special organizations, military schools, gendarmes, etc., used for educational and administrative purposes. The number of officers performing the semimilitary functions of intendants is estimated at about 1000. The cost of the army amounts to from $40,000,000 to $50,000,000 yearly. The military budget for 1913–14, including extraordinary expenditures, was $49,983,035. Late in 1914 the Premier, on account of Japan's participation in the European War as England's ally, asked for an increased army and larger military appropriations for the fiscal year 1914–15.

Arms.—The Japanese infantry uses the improved Arisaka (modified Mauser) rifle, calibre 0.256 inch; the cavalry, a similar carbine; the field artillery, a rapid-fire shielded Krupp gun, calibre 2.95 inches, projectile 14.3 pounds; the mountain artillery, a gun of same calibre with lighter projectile. The light and heavy field howitzer batteries use a 4.6-inch and 5.9-inch piece, firing projectiles of about 44 and 80 pounds respectively. A 4-inch gun is also under construction for issue to the heavy artillery.

Service is universal and compulsory, with liability from 17 to 40, actual service beginning at 20. The first line is made up of two classes: the Geneki, or active service with the colors for 2 years in the infantry, 3 in other arms; the Yobi, or reserves for the active army, with service of 5 (or 4) years and 4 months, making a total of 7 years and 4 months in the first line. In the Yobi training of 60 days each is given on two occasions. The reservists then pass to the Kobi, or second line, for 10 years, where they have two periods of 60 days each with the colors; then to the Kokumin, or third line, home-defense army, for 2 years and 8 months, which completes the liability of 20 years' service. The classes just mentioned are filled by the men of highest physical standard. The excess of these, plus the men capable of bearing arms but of a lower physical standard, up to a certain number, are assigned to a category called Hoju, which is a supplementary reserve to replace losses in war. They do not serve continuously with the colors, but are given a first training of 3 months and report for two subsequent trainings of 2 months each during the Hoju period of 7 years and 4 months. They then pass to the Kobi and Kokumin category in the same way and for the same periods as the first-line men. The men composing the Kokumin, or third line, are thus seen to be made up of men of different degrees of military training. It is divided into two classes, or bans: first, the fully trained men of the first line and the partially trained men of the Hoju; second, the untrained men, made up of the excess not required for the Hoju, the men exempted from military service, and the boys between 17 and 20 years. It should be noted that only fully trained men are assigned to the fighting units of the Kobi, or second line, the partially trained being assigned to the transport, supply, and administrative corps on mobilization for war.

Higher Organization.—The division is the highest permanent organization in peace. There are provided in peace, however, the generals and lieutenant generals and staff officers required for the organization and command of field armies composed of from 3 to 5 divisions each in war. In peace there are in Japan proper 19 divisions, 4 independent cavalry brigades, 3 independent brigades of field artillery (each of 12 batteries of 6 guns each), 3 independent battalions of mountain artillery, and 6 regiments of heavy field artillery, each of 24 guns. The normal division consists of 2 brigades of infantry, a regiment of cavalry of 3 squadrons and 4 machine guns, a regiment of light field artillery (6 batteries of 6 guns each), with such heavy and mountain batteries as may be required, with, possibly, 3 Kobi batteries; 1 battalion of engineers, and the necessary communication, supply, and sanitary troops. The total war strength of a normal division is about 19,000 men, 5000 horses, 36 guns, and 1700 vehicles. The field army, of from 3 to 5 divisions, varies in strength from 80,000 to 130,000 men. Total peace strength of the regular army, according to latest information (1914), is estimated at 250,000 men. Upon initial mobilization this regular or standing peace army could at once be expanded to 600,000 fully trained men. In addition there would still be available about 650,000 fully trained reservists, giving a total trained force of 1,250,000 at the outbreak of war. Adding to these the partially trained and untrained men of the Kokumin, Japan could ultimately mobilize about 3,250,000 men.

Infantry Organization.—Four companies to the battalion of 1000 rifles (war), 3 battalions to the regiment, 2 regiments to the brigade. In 1914 the standing army consisted of 76 regiments (228 battalions), the Kobi of 228 battalions.

Cavalry Organization.—The scarcity of horses in Japan, the demands on the supply, and the expense of maintenance have retarded the development of this arm. There are in the standing army 27 regiments (89 squadrons), in the Kobi 57 squadrons. Peace footing, about 5 officers and 136 men per squadron; war strength but slightly greater. See CAVALRY.

Artillery Organization.—Field artillery, the German system of 6 guns to the battery, 3 batteries to the battalion, 2 battalions to the regiment; in the standing army, 150 field batteries, 9 mountain batteries, 19 battalions of garrison artillery; in the Kobi, 114 field batteries, 12 battalions of garrison artillery. Peace strength, about 5 officers and 120 men; war strength, 5 officers and 154 men.

Technical Troops.—Active army, 19 battalions of engineers, each of 3 companies. Peace strength of a battalion, 21 officers and 374 men; war, 660 men. Kobi, 19 battalions. There is in addition a "communication corps," consisting of railway, telegraph, and aëronautical troops. The strength and equipment of the latter is not definitely known.

Supply Trains.—The train troops are organized into battalions of 2 companies each, to which is added a third company in war. One battalion is assigned to each of the 19 divisions. Peace footing of battalions, 17 officers and 596 men; war footing of a company, 10 officers and 880 men. The total war strength of the train of the 19 divisions is about 51,000 officers and men.

Sanitary Troops.—Six field hospitals accompany each division in war. Peace strength of the medical department is estimated at 1250 officers and 2200 men; the war strength is not known.

Colonial Troops.—In addition to the troops mentioned a division is maintained in Formosa, about 30,000 men in Korea and Manchuria, and small garrisons in Sakhalin and Tsushima.

Navy. The Japanese have always been a seagoing people, and they have had a naval force for many centuries, chiefly as a weapon of defense and offense against the hereditary enemy, China. An old Japanese painting (its date said to be about 1300 A.D.) shows a naval fight with the Chinese in which the ships are wreathed with the smoke of their guns. If the date is correct, this is the first-known naval battle in which guns were used.

The modern Japanese navy may be said to have commenced with the purchase of the armored ram *Stonewall* (renamed Adzuma), which was built for the Confederate navy and sold to Japan at the close of the Civil War. From that time the navy increased slowly until 1894, when the war broke out with China. The resistance of the heavy Chinese armor-clads, notwithstanding their defeat, showed the value of such vessels. Japan ordered 2 first-class battleships in England at this time; and during the next 10 years 4 more battleships and 8 armored cruisers were built or purchased, as were also a number of smaller cruisers and torpedo craft. In the meantime the Japanese navy yards were greatly improved and excellently equipped for building and repair of vessels of all kinds. In 1904 the Japanese navy was in a condition to cope successfully with that of Russia, and the resulting victories not only humbled her antagonist, but added to her fleet 6 battleships, 1 armored cruiser, and 2 coast-defense vessels. Two of her own most powerful battleships were sunk.

The value of a strong navy to an island empire was now fully realized, if it had not been before, and Japan made extensive plans to build one of the great navies of the world. But the cost of the war with Russia and the developing of the conquered territory made such a severe strain upon Japanese finances that the naval construction proceeded much less rapidly than was desired. Nevertheless 7 battleships were completed or placed under construction between 1904 and 1914, also 4 battle cruisers and 5 large armored cruisers carrying heavy guns. A scandal in the Navy Department in connection with foreign contracts was made a pretext by the Japanese Parliament to cut down the naval appropriations to such an extent that the work on shipbuilding was greatly retarded, and no new keels were to be laid during 1914–15. The lack of money for the navy is likely to be felt until Korea and the other additions to the Empire cease to be a source of expense and afford a revenue.

TYPE	Displ.	Guns	Speed
2 battleships........	20,760	12 12-in.	20k.
2 "	19,500	4 12-in. 12 10-in.	20k.
2 "	16,500	4 12-in. 4 10-in.	20k.
4 "	16,500	4 12-in.	18k.
5 "	11,200 to 15,800	4 12-in.	18k.
7 coast-defense vessels	2,000 to 5,000	4 12-in.	18k.
2 battle cruisers.....	27,500	8 14-in.	28k.
2 heavy armored cruisers.........	14,600	4 12-in.	22k.
2 heavy armored cruisers.........	15,150	4 12-in.	21k.
6 armored cruisers...	9,700	4 8-in.	21k.
2 " " ...	7,700	4 8-in.	20k.
1 " cruiser...	7,700	2 8-in.	21k.
16 small cruisers......	1,250 to 7,000	various	19k. to 26k.
2 destroyers.........	1,150	2 4-in.	35k.
2 "	790	2 4-in.	33k.
35 "	380	6 3-in.	29k.
16 "	240 to 370	1 3-in.	26k. to 31k.
48 torpedo boats.....	50 to 150	various	20k. to 29k.
13 submarines........	106 to 320	......	7k. to 13k.
Vessels building:			
4 battleships........	31,500	12 14-in.	22k.
2 battle cruisers.....	27,500	8 14-in.	28k.
2 destroyers.........	.....	....	...
2 submarines........	.....	....	...

In 1914 the strength of her fleet placed Japan fifth among naval powers. The numbers of the *personnel* were doubtful, as a considerable portion of the enlisted force had been released owing to the lack of money. The latest official reports (1913) give 4035 commissioned officers, 1553 warrant officers, and 43,847 enlisted men. The fleet consisted of the ships enumerated in the preceding table, which gives the displacement in tons, number and calibre of principal guns, and maximum speed.

The principal dockyards are at Yokosuka, Kure, Sasebo, Onohama, and Nagasaki. These are well equipped, and most of the vessels of the navy are built in them. The Navy Department is one of the principal departments of the government and is presided over by the Minister of Marine. See NAVIES.

Political Divisions. Omitting Formosa (q.v.) and Korea (q.v.), it may be stated that Japan is divided (1) into 84 provinces, separated the one from the other by natural boundaries; and (2) for administrative purposes into *fu* and *ken*, or prefectures. The former is the older division and dates back many centuries, though the number has not always been the same. Their names are in more general everyday use than those of the newer divisions. With only one or two exceptions each has both a Japanese and a Chinese name; thus, Yamashiro is also called Joshu, and so on, those ending in *-shu* (which may be translated 'province') being of Chinese origin. Of these 84 provinces two are separate islands (Iki and Tsushima, which lie between the island of Kiushu and Korea). The others are grouped into nine regions, of which eight are named *do*, or circuits. The other is the *Go-kinai*, or Five Home Provinces, which surround the old capital, Kyoto (q.v.). Taken in order from east to west, the eight circuits are as follows: (1) Hokkaido, or North Sea Circuit, comprising the 10 provinces of Yezo (q.v.), and an eleventh added in 1875, made up of the Kurile Islands; (2) Tosando, or Eastern Mountain Circuit, comprising 13 provinces, the most easterly of which lie towards Yezo; (3) Tokaido, or Eastern Sea Circuit, comprising 15 provinces, and stretching along the Pacific from Sendai Bay towards the Five Home Provinces (Fuji-san, Tokyo, Yokohama, and other important or well-known places are in this do); (4) Hokuroku-do (or riku-do), the Northern Land Circuit, lies along the Sea of Japan and comprises seven provinces; (5) San-in-do, or Mountain Shade Circuit, comprises eight provinces which border the Sea of Japan; (6) San-yo-do, or Mountain Sun Circuit, lying along the south or "sunny" side of the mountains (the last two circuits are frequently spoken of as Chugoku, or the Central Provinces); (7) Nan-kai-do, or the South Sea Circuit, comprising the four provinces of Shikoku, the island of Awaji, and Kiushu on the main island, six in all; (8) Saikai-do, or the West Sea Circuit, comprising the nine provinces of Kiushu. The subdivisions of the provinces are called *kori*.

SECTION	Pop. 1908	Prefectures	Rural districts	Cities	Towns	Villages
Mainland:						
Central........	19,004,481	17	202	23	544	4,148
Northern......	7,480,432	7	90	12	217	1,698
Western.......	10,929,374	10	137	14	215	2,769
Shikoku..........	3,288,310	4	36	5	69	742
Kiushu	7,246,934	7	80	10	126	1,407
Okinawa..........	501,818	1	5	2	1	48
Hokkaido.........	1,137,455	1	87	3	22	313
Total........	49,588,804	47	637	69	1,194	11,125
Korea (Chosen)...	13,071,177	..	..	..	4,351	....
Formosa (Taiwan)	3,252,589	..	..	..	3,017	....
Japanese Sakhalin (Karafuto).....	26,393	..	..	..	....	....
Grand total...	65,938,963					

For administrative purposes the Empire is divided into *fu*, or municipal prefectures, and *ken*, or rural prefectures. These prefectures are further divided into *gun kori*, or districts, *shi*, or cities, and rural towns, and villages ranked as *cho* and *son*. The preceding table shows the population of the sections of the Empire, with the population according to the census of 1908, and the number of prefectures, rural districts, cities, towns, and villages in 1911.

The capital of the country is Tokyo (q.v.). The pre-Restoration capital was Kyoto.

Population. The first really reliable census of the whole country was taken in 1872. This showed 7,107,841 houses and a total population of 33,110,825—less than that of the main island at the present time. At the end of 1898 the number of houses had increased to 8,281,708, and the population to 43,763,153. Of this total number the nobility claimed 4551, the gentry 2,105,696, and the common people 41,050,568. On Jan. 1, 1909, the number of Japanese proper (i.e., exclusive of the natives of Formosa, the Pescadores, and other dependencies), at home and abroad, divided according to the six statistical divisions, was as follows:

	Population	Pop. per square kilometer
Hondo, central...........	19,004,481	214
Hondo, northern.........	7,480,434	93
Hondo, western..........	10,929,374	217
Total Hondo.........	37,414,889	
Shikoku.................	3,288,310	175
Kiushu..................	7,246,937	181
Hokkaido...............	1,137,455	16
Grand total..........	49,588,804	135

Of this total, 25,046,380 were males and 24,542,424 females. The numerical strength of the various classes was as follows: nobles, 5642; knights or gentry, 2,218,623; common people, 47,382,262, including 18,017 Ainos in Hokkaido. At the end of 1913 the population was estimated at 52,985,423. The percentage of increase has been as follows: 1872, 0.57; 1881, 0.94; 1886, 0.84; 1891, 0.66; 1896, 1.04; 1900, 1.25; 1901, 1.39; 1902, 1.29; 1903, 1.54; 1904, 1.32; 1905, 1.32; 1906, 1.32; 1910, 1.46; 1911, 1.30; 1912, 1.29; 1913, 1.29.

Since the centralization of modern industries there has been a large concentration of population in the cities and towns. The following table shows the number of communes of each

COMMUNES	1898		1908	
	No. of communes	Population	No. of communes	Population
Under 500 population	750	199,712	229	59,950
500 and under 2,000......	4,250	5,991,450	2,551	3,778,108
2,000 and under 5,000....	8,008	24,427,130	7,649	24,269,615
5,000 and under 10,000...	1,069	6,775,503	1,654	10,736,232
10,000 and under 20,000..	150	1,991,185	268	3,586,200
20,000 and under 50,000..	60	1,747,670	76	2,422,981
50,000 and under 100,000.	12	772,481	19	1,352,565
100,000 and under 200,000	3	423,490	4	530,916
200,000 and under 300,000	2	459,925	..	....
300,000 and under 400,000	1	353,139	3	1,150,731
400,000 and under 500,000	....	....	1	442,462
500,000 and over........	2	2,261,356	2	3,412,726
Total...............	14,262	45,403,041	12,456	51,742,486

class, and the aggregate population in each class of communes, according to the censuses of 1898 and 1908.

Education. Since Japan was opened to foreigners much attention has been given to education, and for a time foreign teachers and advisers were in demand, both by the government and by private persons. The present Department of Education was established in 1871, but much organizing had been done before that time. The advisers were mostly from the United States, and as regards the public-school system which the government had determined to establish, United States models were largely followed. Later German influences prevailed, and the system now in vogue is largely patterned after German models. It includes the following grades:

1. Kindergarten work or infant schools, which originated first in 1876 in connection with the normal school, but have since been extended. The age is from three to six. In 1911 there were 475 such schools, employing 1312 women, with 38,125 infants in attendance.

2. Elementary schools, attendance at which is compulsory, as far as the lower division, called "ordinary schools," is concerned. It is for children from 6 years to 10; the school year is 32 weeks long, and the children are taught morals, reading, writing, composition, and arithmetic, and sometimes gymnastics, drawing, and music are provided. The higher grade is optional for children between 10 and 14. The course of instruction includes geography, history, English, agriculture, and commerce.

3. Middle schools, in two grades, ordinary and higher. The ordinary covers a course of five years and includes ethics, Japanese language, English (then French or German), agriculture, geography, history, mathematics, natural history, physics, chemistry, etc. In the higher grade the course covers two years of Latin, zoölogy, botany, geology, mineralogy, dynamics, surveying, philosophy, etc.

4. The university crowns the whole. There are also normal schools and special schools.

Instruction is not gratuitous, and the local school boards, which are elected by the people, have to provide for those too poor to pay. The school age is from 6 to 14. In 1911 the number of children of school age was 8,604,787, of which 4,482,609 were boys and 4,122,178 were girls. In 1911–12 the public and private primary schools numbered 25,750, with 157,536 teachers and 7,021,661 pupils in attendance. In 1880 the rate of attendance per 100 children of school age was 41.06; in 1903 it was 92.23; in 1910–11 it was 98.14, an increase of 0.04 over the previous year. A notable fact is the spread of female education. In 1880 the rate of attendance per 100 children of school age was 57.60 for boys and 23.51 for girls; in 1903 the rate for boys was 96.59 and for girls 89.58; in 1910–11 the rate was 98.83 for boys and 97.38 for girls.

In 1911–12 there were 314 middle schools, with 6092 instructors and 125,304 pupils; 83 normal schools, with 1571 instructors and 27,076 students; 7298 special and technical schools, with 8247 instructors and 394,586 students; 250 superior (or high) schools for girls, with 3300 instructors and 64,809 students; 2266 miscellaneous schools (1910–11), with 7346 instructors and 144,089 pupils.

There were 9 special schools of medicine and pharmacy, with 3389 students; 10 schools of law and politics, with 14,267 students; 241 agricultural schools, with 26,945 students; 108 apprentices' schools, with 10,018 students; 97 commercial schools, with 24,642 students; 12 nautical schools, with 1973 students; 15 fishery schools, with 912 students; 34 schools for the fine arts, languages, etc., embracing 5595. There are numerous preparatory schools for each of the above divisions. The 445 libraries had a total of 2,750,205 volumes in 1911–12, of which 2,600,278 were Japanese and Chinese works and 149,927 European. The Imperial University at Tokyo was founded in 1869 by the consolidation of two schools, the Kai-sei-gakko and the Shoheiko, and later other colleges were added. In 1911–12 it had 372 professors and instructors (including 15 foreign) and 4984 students. The University of Kyoto was opened in 1889, with one foreign and 69 native professors and 360 students; in 1911–12 it had 158 professors and 1226 students. There are, besides, two universities maintained from private funds, the Keiogijuku University, founded in 1865, and the Waseda University, founded in 1882 and converted into a university institution in 1902. In 1911–12 there were published 43,153 books, most of them on politics, industry, law, and religion. There were 1793 periodicals in that year.

Religion. Japan has really three religions—Shinto, Buddhism, and Christianity. Under the new constitution of 1889 absolute freedom of speech and freedom of religious opinion and belief are guaranteed. Shinto (the way of the gods) is a purely native cult. It has no creed, no doctrinal system, no moral code, no priests, and no images in its 130,258 (in 1908) temples and shrines, though it has nearly 14,000 gods, before whom, or some of whom, certain offerings are made from time to time; to whom certain prayers are addressed on such occasions, and before whom certain ceremonious dances are performed in a very punctilious and decorous way. It appears to be a mild kind of ancestor and hero worship which has come down from primitive times. The chief deity is Amaterasu (the sun goddess), from whom the mikados are descended. It exerts no particular influence for good on the people, though it does them no harm. From the ninth century onward it became much tinged and corrupted with Buddhism, indeed was practically absorbed by it, Kobo Daishi (q.v.) having apparently convinced everybody that the Shinto gods were merely manifestations or transmigrations of Buddhist deities. It is stated that 13 sects of Shinto now exist.

Buddhism entered Japan by way of Korea in 552 along with the arts, sciences, and letters of China. Its gilded images and its gorgeous temples and ritual appealed to the Japanese mind, and the new religion became popular. It gained both the favor and the patronage of the Imperial court, and in 621 it was by edict proclaimed to be the established religion. Priests went to China, or were sent there by the government to study, and these on their return brought with them new scriptures, new sects, and new ideas which soon began to blossom out into other new sects in Japan. Kobo Daishi in 816 founded the Shingon (q.v.), or the sect with the form of "true words"; the Zen, or "contemplative" sect, was introduced in 1202; the Jodo, or "pure-land" sect (see Ts'ing-tu and Sukhavati), in 1211; the Shinshu, or "true sect," an offshoot of the preceding, in 1262; the Nichiren in 1282; and many others. Now there are 70 sects and subsects, all based on or developments of the

Mahayana, or Northern School of Buddhism, in which Sakyamuni, the historical Buddha, has little or no place. The most important of these as far as influencing the people is concerned are the Jodo, which finds Nirvana too hard to attain to and provides instead a "Paradise in the West," presided over by Amida Buddha, where the faithful may enjoy a blissful existence through untold ages, and whence, if they have to be reborn, it will be easy to reach the Nirvana state. The Shinshu, an offshoot from Jodo, has been called the "Protestantism of Japan." It teaches that salvation may be obtained merely by faith in the mercy of Amida—the chief of the Buddhas—and his ability to save, without works of any kind. No change of heart or conduct is necessary, and nothing is required beyond loving one another, keeping orderly, and observing the laws of the government. Its priests may marry, and they are free to eat both flesh and fish. This is the most powerful of the Japanese sects; its temples are large and magnificent, are found in the most crowded parts of the cities, and are thronged day and night with silent worshipers. In 1899 its temples numbered 19,213. Buddhism was disestablished in 1871 and disendowed in 1874, and there is now no state religion. The great majority of the people are Buddhists, but there are no organized bodies of church members as there are in Christendom. Among the upper classes agnosticism prevails.

If Shinto can be called a religion, then Christianity comes third. All its churches are enrolled by the government and are protected by law. In 1908 there were 789 Protestant missionaries, including women, 1303 native preachers, ordained or not, men or women, 10,554 churches, 57,830 enrolled members, and 1066 Sunday schools with 84,160 children. The Roman Catholics had 144 European missionaries, 182 church edifices, 62,694 Christians, 93 religious men, and 389 religious women (foreigners and natives). The Greek church had 37 native priests and 129 catechists, and 30,166 baptized Christians according to one reckoning, 13,000 followers according to another. Little has been written about the work of the Russians in Japan; even in Russia almost nothing has ever been published.

In 1908 there were 71,784 Buddhist temples and monasteries, with 73,406 priests and 51,587 preachers and 9976 students. The Shinto temples numbered 130,258, in charge of 14,498 *kannushi*, or priests. The Roman Catholic, Greek, Anglican, and Protestant churches and preaching stations numbered 1290.

Ethnology. The modern Japanese are a very mixed people. The largest factor in the production of the Japanese is to be traced back to the Mongolian race of the adjacent continent, a view confirmed by the physical characteristics of a considerable portion of the population at the present time. Some, indeed, group Japanese and Koreans together as being ancestrally very closely akin, by physical characters as well as by speech. But among the Japanese, as among the Koreans, and in certain parts of China, there are recognizable three physical types—an Ainu type, chiefly characteristic of north Japan; a Manchu-Korean, in the regions nearest Korea; and a Malayo-Mongolic, in the centre and east. The Korean-Manchu type seems to go back, like the primitive Chinese, to a Mongolian ancestry with a strain of proto-Caucasian blood, while the Ainus (see AINO) are perhaps allied to the most primitive Caucasians; but such opinions must be accepted with caution. The best authorities agree in distinguishing a "fine" and a "coarse" type among the modern Japanese. The former is taller, more slenderly and gracefully built, longer-faced and longer-headed, with better-shaped nose, and, generally, less distinctively Mongolic in form and features, with lighter skin, etc. The "finer" type may be considered to be the descendants of the Japanese immigrants from the continent, who conquered and intermingled with the original inhabitants, or Ainus. This "fine" type has now become the Japanese ideal. The "coarse" type is characterized by shorter stature and thickset body, broader skull and face, more prominent cheek bones, somewhat oblique eyes, large lips, wide mouth, more powerful jaw, flattish nose and wide nostrils, darker skin, and generally more of the Mongolian in form and feature.

The population of Japan may thus be considered to consist of a prehistoric proto-Ainu and later historic Ainu element, upon which the Sibiric ancestors of the Japanese proper imposed themselves by slow degrees until they ultimately became the dominant factor. There has been added, perhaps at several different periods, a Malay or Polynesian element, which is noticeable in central and east Japan, where it is thought to have modified considerably both physical and social characters. Traces of ancient Negrito influence have been seen in Japan by some authorities, but others attach no importance to these alleged proofs of the former existence of a black race in Japan.

Physically the Japanese are not a strongly developed people, but they are capable of great exertion and endurance. A number of somatic peculiarities have been noted in the Japanese, such as the divided molar bone (*os japonicum*), the low, broad upper jaw, without canine fossa, and the so-called "Japanese knee" (due to the practice of sitting so much). In their general physical conformation many of the Japanese males of the better classes have a decidedly feminine or even childlike cast—a character thought by some authorities to belong more or less to the Mongolian race in general.

Intellectually the Japanese have shown a capacity equal to that of any other known people, and their native power is revealed by the fact that while their manners, customs, and certain institutions were modified in ancient times by Chinese culture, and in recent times by European and American civilization, the fundamental traits of their character have not been altered. The mental and moral characters of the Japanese may be summed up as patience and persistence, combined with cheerfulness, a certain versatility and quick-wittedness, enterprise and originality, together with unexcelled powers of imitation, as well as progressiveness, industry, artistic sense, humor, cleanliness, politeness, honor, bravery, kindness, calmness, and ability to conceal the emotions. From the Chinese and some other Mongolian peoples the Japanese differ in the freedom accorded to women from the remotest times down to the present day, their less altruistic ethical system, their high estimation of the warrior and their appreciation of war as a means of national advancement, their national virility, and their power to respond to and accept facts of modern social and historical evolution. The social and moral life of the Japanese offers much that is interesting in the way of evolution. In sexual relations they are now monogamous, though polygamy was formerly permissible.

As compared with China, and perhaps with Korea, the civilization of Japan is comparatively modern, for the coming of the continental Mongoloid ancestors of the Japanese to the island may be fixed at 2000–1500 B.C. Their conquest of the various islands of the great archipelago was slow and apparently difficult, as the Japanese annals themselves record, for the Ainu and proto-Ainu population was well distributed throughout the group. Relics of Ainu origin are found almost everywhere, but naturally in more abundance towards the north. The amount of Ainu blood in the modern Japanese is considerably more than hitherto supposed, and the liberal policy of the present authorities towards the Ainus of the extreme north is leading to a recognition of the abilities and intellectuality of this ancient and primitive people, pointing to their ultimate disappearance, not by dying out or extermination, but by absorption into the general population. The question of the Malayan or Polynesian element in Japan is more difficult to elucidate. Twice at least in Japanese annals there is mention of swarthy foreigners from the south who made irruptions into east and central Japan. These, according to several authorities, were Malayan or Malayoid tribes, who came by way of Formosa and the Loo-choo Islands, and the physical characteristics of this section of Japan bear testimony to their presence and their numbers. Other evidence of a Malayan influence exists, according to some ethnologists, in the structure of the house, the practice of massage, certain dances, luxury, and love of weapons. Some of these resemblances are too general, however, and others too clearly the product of the Japanese environment, to be conclusive evidence. The introduction of Chinese and Korean civilization into Japan dates back for its beginnings to about the first Christian century, and this influence was strengthened after the transference of Buddhism in the sixth century.

Manners, Customs, etc. The Japanese are a cheerful, contented people, lovers of nature, and always ready for a holiday. Opium growing and the importation of it are forbidden, and government supplies the needs of the medical profession. Courteousness is a distinguishing trait, and their ceremonious politeness is oftentimes most embarrassing to the foreigner, who is not usually given to self-depreciatory remarks, and whose stock of honorifics is small and not always instantly at command. Hand-shaking is not a Japanese custom, and the lowness of the obeisance varies with the rank of the individual, women and the lower classes usually getting down on their knees. Children dress like their elders, and though their footgear is clogs held on by a band passing between the big toe and the next one, they romp and run as much and as fast as European or American children. Their socks—when they wear them—have a separate compartment for the big toe. Their toys and indoor amusements are innumerable. In dress the Japanese are not burdened with much underclothing. Their chief outer garment is the loose-sleeved gown known as the kimono, open in front but bound round the waist with a sash. That of the women is a little longer, differs somewhat in the sleeves, and the sash, or *obi*, is wide and formed into a bow at the back which varies in style according to age, etc. Married women used to shave off their eyebrows and blacken their teeth with the juice of the persimmon tree. The coiffure is an elaborate construction, with "waterfalls," plastered down with bandoline and decked with stickpins.

Japanese houses are usually of one story. There are no cellars. The floor is about 2½ or 3 feet from the ground and is formed of soft, thickly padded mats measuring 6 feet by 3, and on these the family sit (or rather squat on their heels), eat, and sleep. There are no tables, chairs, or bedsteads, thick wadded quilts serving as mattress and blankets. Heat when wanted is provided by a *hibachi*, or brazier filled with burning charcoal. The pillow was formerly a little paper-covered cylindrical cushion strapped on a narrow stool, and placed under the neck so as not to disturb the hair, but the European pillow is now in general use. Footgear is left in the porch before stepping on the veranda. A single picture, changed with the season, and a small wall vase containing a single sprig, form the only decoration, apart from that of the *shōji*, or sliding paper screens which serve as partitions. Passers-by may get a glimpse through the open screens of a tiny garden at the back, with a miniature rivulet, a stone thrown across it as a bridge, a miniature hillock crowned with a dwarfed pine, and a flowering shrub or two, and perhaps a stone-pillar lantern. A necessary feature of every house is the "god shelf," or family altar, where is the little shrine—Shinto or Buddhist—before which the offerings are placed. Cleanliness is next to godliness, and the bathtub at the back, with its little furnace in one end for boiling the water, is patronized by every member of the family in succession, the water being invariably hot (100° to 115° F.).

Food is served on little lacquered stands about a foot high and is eaten with chopsticks (both of the same material). Rice, with soup of seaweed, beans, vegetables, or hard-boiled egg cut up into pieces, with a little fish with soy, and the like, daintily served, make the meal, sake (their fermented beverage) when used being heated and served in the tiniest of porcelain cups. Tea is the usual beverage. But there is no meal called "tea." Pickled daikon (or radish) is their chief relish.

Married life is usually happy. Cremation was introduced by the Buddhists about 700 A.D. After the Restoration it was forbidden, but a custom of such long standing could not be wiped out with the stroke of a pen. Those who favor the Shinto cult bury their dead in coffins.

History. Japan begins its history with a year corresponding to 660 B.C., when Jimmu Tenno (q.v.), the leader of a band of invaders, settled in Yamato after having conquered several of the tribes who opposed him. Our only source of information in regard to the early history of the dynasty which was founded by him, and which exists to the present day, is found in the *Kojiki*, the oldest extant book of Japan, in which are found the myths and legends written down in Chinese characters in the years 711–712 by one Yasumaro, from the lips of a person named Hiyeda-no-Are, who possessed a most wonderful memory. These myths and legends, under close analysis, show three streams of legends: the Tsukushi or Kiushu cycle; the Idzumo legendary cycle, which covers central and west Japan; and the Yamato cycle, which covers the central and eastern parts of the main island. The north and east parts of the main island were inhabited by the Emishi savages, or Ainus, who had retired thither before the advancing invaders, leaving their names on rivers, mountains, streams, and other natural landmarks. In the south dwelt aboriginal people, perhaps from the Malay regions. The invaders of the archipelago, whether coming from Tartary or Korea, were without letters or writings, but possessed superior arms, valor, and discipline. They came as immigrants, at various times and to various places, finding people already on the soil, whom they proceeded to put under their control.

There are thus early discerned with clearness, in the morning of the history of Japan, race struggles among various tribes of differing customs and languages, and two types of men, whom we now call Japanese and Ainus, the former living south, the latter north of the thirty-eighth parallel. Gradually the Tsukushi and the Idzumo people became subordinate to the Yamato house or tribe. The conquerors intermarried with the subjugated, and the pacified chiefs were awarded rank and honor, while the power of the Mikado or Yamato chief was consolidated by making the primitive cult, now called Shinto, or Kami-no-michi, a political engine. The whole country was put under a rude feudal system, the conquered or subordinated holding their lands in loyalty to the Yamato chieftain or Mikado. Civilization gradually drifted in from Korea, through teachers, artificers, and men of learning. There are indications that a century or two before the great flood of civilizing influences was borne on the waves of Buddhism, considerable knowledge of Chinese letters, writing, and ethical notions had penetrated to the Yamato court and among some of the chiefs of the southwest. The *Nihongi* (another historical work, compiled in 720 A.D.) states that in the year 405 a Korean scholar was appointed tutor in Chinese classics to one of the Imperial princes, and that about the year 430 "historiographers were appointed." As yet, however, there was no such thing as a settled capital, the Mikado and his household moving from place to place in central Japan. After the death of the Mikado chief, his successor, with a horror of the place of the dead, moved on and built a new palace. There have been thus no fewer than 60 capitals. To-day the provinces of Yamato, Yamashiro, Kawachi, and Settsu "are dotted with places, now mere villages, sometimes indeed empty names, but once in the proud position of capitals of the Empire."

The line between legend and true history is made clear upon the arrival in 552 A.D. of Buddhist missionaries from Korea, who brought with them not only the sutras and images of their cult—the Mahayana northern form of Buddhism—but also letters, writing, calendars, and methods of keeping time. Buddhism took root and became so popular with both court and people that in 621 it was proclaimed by edict to be the established religion of the land. From this time forth we have something like a coherent account of things and can trace with some clearness, through many rebellions and oppositions, the rise to paramountcy of the Yamato house. Nara in Yamato became the fixed capital and remained so for seven reigns between the years 709 and 784. One decade later Kyoto was made the Imperial residence and, with few interruptions, continued to be so until 1868. At the opening of the seventh century Chinese civilization had so far been accepted that in 603 the form of government was changed from feudalism to monarchy; eight boards or departments of state were established, in imitation of the Chinese system; and a new order of nobility, in nine ranks, was created. A great council, called the Dajo-Kwan, which had also been established, superintended the eight boards and ruled the Empire by means of local governors appointed and sent out from the capital.

The practical enforcement of this new centralized system of rule from Kyoto was not acceptable and was in many places long and stoutly resisted. Gradually a military class was formed, which became separate from the agricultural, the latter comprising the farmers and those who permanently tilled the soil. By parallel development the men at arms became professional soldiers. Other great lines of movement may be summarized in the increasing centralization of government and the withdrawal of the Mikado from active service in the field or even in the affairs of government and his comparative seclusion. Under the pretext of religion or a desire to lay aside the cares of government, committing the actual work of administration to his subordinates in order to seek retirement, he became in the national life rather an abstraction than a person.

By means of the superior valor, force, and skill of its soldiers the Empire was extended north, south, east, and west until all Kiushu and Shikoku were subdued and the arms of Japan extended to the far east and north. Meantime in the capital and palace the Fujiwara family, who had come into position and power about the year 670, had developed a bureaucracy, so that they gradually monopolized most of the offices in and about the court and the administrative boards. In other civilian families the particular administration of sacred rites or the cultivation of learning became the specialty or monopoly. The military commands were always given to the rival clans of the Taira and Minamoto. The Taira warriors, fighting under the white crest or banner, gained renown and power in the southwest. The Minamoto, under the red banner or crest, won victory and held power in the east and north; but when once the activities of the field were comparatively things of the past, both clans lusted for power nearer the throne. Then began a struggle in the capital. The Fujiwara, who had formed a ring around the Emperor and by their own henchmen blocked most of the ways of approach by nepotism, were ousted by the Taira, whose star was now in the ascendant. This naturally excited the jealousy of the Minamoto, and in the year 1159 the two rival military clans came to blows. Then began that famous period of the wars of Genji and Heiké, which have since colored all Japanese history, literature, and art, and which in later times, even to this day, have given the standard and motives for games of skill and chance. Kiyomori, the Taira chief, became Premier in 1167. He not only redistributed the offices, civil and military, among his own clansmen, but by marrying his daughter to the Emperor controlled the throne itself. The Minamoto men, their leaders beheaded or banished, were scattered, one line becoming rulers of far-off Loo-choo. In 1181, after Kiyomori's death, Yoritomo led the Minamoto in an uprising, and under the generalship of Yoshitsuné, his brother, the Taira men were driven out of the capital and from their palaces. After several land battles and a great naval conflict near Shimonoseki (1185) the Taira were annihilated. The divisive evolution between military and civil power had so far proceeded that, leaving Kyoto to be the centre of honor and tradition and of that outward form which in Japan, as in China, saves the "face" of a thing, Yoritomo fixed his seat of authority, in the name of the Emperor, at Kamakura, in the Far East, on the bay of Tokyo. He had himself appointed Shogun, or general (1192), and was hailed as the great peace bringer. Although his line came to an end in 1219, yet the system which he inaugurated was carried out by the Hojo family of regents, who held power until 1333. Obtaining from Kyoto, in the name of the Emperor, nobles who were mere children and puppets, to whom the title of Shogun was given, while they held the power themselves, the Hojo ruled the Empire. It was during their rule at Kamakura that the armada of the Mongol Tatars was destroyed by storms and the valor of the Japanese. Several of the Hojo regents were men of great ability and ruled with justice and vigor.

From the moment of Yoritomo's success feudalism entered upon a new stage of development. Under the Imperial system, from 603 to 1182, the governors sent out from Kyoto to the different provinces under a four years' tenure of office had charge both of the collection of revenue and the repression of crime. Yoritomo had no sooner got control of the east than he obtained from the Emperor a civil title equivalent to that of "high constable of the realm," by which means he had the two departments of revenue and the maintenance of order divided, leaving the Emperor's officers to collect the revenue, while he repressed crime and maintained order. This system of appointing military magistrates seemed to be so excellent that it was gradually extended all over the country. Yet all the time Yoritomo cloaked his military ambition under the guise of his civil title, so that when, in 1192, he was made Shogun, and was thus military commander in chief, he was already the virtual ruler of the country. Seeing this, the Imperial officers in charge of the revenue left Kyoto for Kamakura, and the Shogun thus possessed both purse and sword, leaving Emperor and court, in honor and poverty, dependent on him. Henceforth the functions of government were separated into those of throne and camp—the former the centre of mystery and the fountain of honor, the latter being the actual government. The Hojo were overthrown by the brave warrior Nitta in 1333. Then followed for a while, but for two years only, what may be called the temporary mikadoate, when there was no Shogun and theoretically no feudalism.

That the mikados had not yet, however, vigor enough to enter upon personal rule was shown in the fact that when the adherents of rival nominees to the throne went to war over the division of spoils, the Mikado could not restrain them. Civil war broke out, lasting 56 years, when two rival lines of mikados held the shadow of power, in the period 1336–92, and there were two capitals, though the real rulers were the shoguns of the Ashikaga family. In 1392 one of their envoys persuaded the Mikado, who had the three Imperial regalia—mirror, crystal ball, and sword—to come to Kyoto and hand over the sacred emblems, and the feud was healed. Now that the Ashikagas had their nominee on the Imperial throne, the second great step in feudalism was taken by them, when they made the military magistracies, established by Yoritomo, hereditary in the families of their own nominees. Thus arose the class of daimyos. (See DAIMYO.) The Ashikaga power lasted until 1573, during which time the Portuguese came to Japan, Mendez Pinto (q.v.) landing in 1542 and Xavier in 1549, beginning a period of intercourse with Europeans which continued until about 1620, during which Christianity and firearms were introduced. In general the period of the Ashikaga rule was one of great refinement of manners, of high art and literary culture, along with the missionary expansion of Buddhism and a remarkable phase of doctrinal evolution. On its political side Buddhism reached a point of wealth, luxury, and menacing military power which made it one of the great forces in the state, calling for some powerful hand to put it down. As the Ashikaga became weaker in their later years, anarchy grew to be more general. The Buddhist abbots and their monks, in arms and armor, possessing closer organization and with fortified monasteries, often turned the scale of power. From 1573 to 1604 was the period of the three famous men Nobunaga (q.v.) (1533–82), Hideyoshi (q.v.) (1536–98), and Iyeyasu (q.v.) (1542–1616). The first humbled the Buddhists, the second reduced the daimyos to submission, and the third consolidated results. The third decisive step in the development of feudalism was taken by Hideyoshi when he rearranged the feudal map of the Empire, marking out the boundaries of the fiefs and appointing to them the daimyos as his own nominees, giving them titles in his own name without reference to the Emperor. During Hideyoshi's time Korea was invaded (1592–98) by his hosts of warriors, who on the return of peace in Japan had been left without occupation. Iyeyasu, his successor, making Yeddo his capital, carried out Hideyoshi's plans, so enlarging them that he and his grandson, Iyemitsu, gave the final form to Japanese feudalism, which early in the middle of the seventeenth century had become settled in routine. It is noteworthy that alongside of elaborate feudal institutions grew up a commercial and industrial system like that contemporaneous with late feudalism in Europe. Yeddo, from a village, became the greatest city in the Empire. The Tokugawa family furnished, from 1603 to 1868, 15 shoguns. Christianity was, as was thought, rooted out. Then began a great development in art, literature, the study of ancient history and the native language, and the revival of pure Shinto (q.v.). The policy followed was that of the exclusion of foreigners and the inclusion of the people of Japan within their island walls, while their intellect was kept within fixed bounds.

Shipwrecks and the casting away of seamen gave the United States government its opportunity to seek a treaty of friendship and, if possible, of commerce. In 1854 Commodore Perry, to whom the task was intrusted, succeeded in establishing treaty relations between Japan and the United States. Four years later other treaties opened several ports to foreign residence and trade. In 1860 a Japanese embassy visited the United States, and in the following year ambassadors were sent to the European courts. Narrow-minded patriots protested, but the great clans of the southwest, always detesting the northern rule of Yeddo, gradually gathered around the court. In 1867 the Shogun was compelled to resign, and when in 1868 he sought to regain power by force of arms, he was driven from the field. Men with new ideas and determined purpose obtained control of the Emperor and the government, moved the capital to Yeddo, had the sovereign swear to rule according to "the right way between heaven and earth" (in deference to public opinion), and began the abolition of feudalism. It was virtually a committee of four men, Iwakura, Okubo, Kido, and Saigo, with their farseeing fellows and helpers, that led the samurai to swing the nation out of ancient routine in order to create the new Japan. They invited educators from the United States to reorganize their educational system, French officers to remodel their army, British seamen to reorganize their navy, and Dutch and other engineers to make internal improvements. These tremendous changes were not accomplished without protest. In 1887 Saigo quarreled with his old friends, led an army "against the Emperor's evil advisers," and the Satsuma Rebellion cost Japan 20,000 lives and $50,000,000. In 1879 Loo-choo was made an integral part of the Empire, and Sho Tai, the King, brought to Tokyo and made Marquis. Western laws were introduced and codified. In pursuance of the Imperial oath, a Parliament was promised. In 1884 the nobility was organized on the European idea, and many new men were honored with titles. In 1889 the constitution was proclaimed, and the Diet met in 1891. With many an ebb and flow the great tide of progress has kept on. In 1894 war with China broke out in regard to Korea; this resulted in the utter defeat of China, the cession in 1895 of Formosa to Japan, the payment of a large indemnity, and the independence of Korea. The decisive triumph of Japan was notice to the world of the advent of a new power in the East whose voice would be heard in future political arrangements. Even before the outbreak of the war the nation had entered on a series of treaty negotiations which was to admit it to full equality with the Powers through the abolition of the obnoxious consular courts. As a preliminary step a thorough revision was effected of the different legal codes, criminal, penal, judicial, civil, and commercial. Great Britain and the United States were the first to abandon the principle of extraterritoriality (1894), receiving in return the freedom of the entire Empire for their trade. Similar treaties were concluded in 1895–96 with all the European nations of consequence, all the treaties to go into effect in 1899. The sphere of national interest had broadened as a result of the war. The pacification of Formosa, which was made difficult by the activity of Chinese irregular bands or "black flags," was actively carried on. In Korea Japanese influence had to contend with the aspirations of Russia, against whom, naturally, bitter resentment was cherished as the leader in the Triple Alliance of the European Powers which in 1895 had deprived the nation of the greater share of the fruits of victory. In 1898 the two Powers by treaty made formal recognition of the independence of Korea and pledged themselves to abstain from all interference with the internal affairs of that Empire.

During the Boxer uprising the Japanese troops more than held their own among the international forces which marched on Peking. In the diplomatic struggles which followed the occupation of Manchuria by Russia, an act which Japan regarded as portending peculiar danger to its interests, the latter nation found itself again confronted by the 1895 alliance of Russia, Germany, and France. The result was the Anglo-Japanese alliance concluded Jan. 30, 1902, for a period of five years. The two governments, declaring themselves specially interested in maintaining the independence and territorial integrity of the empires of China and Korea, guaranteed to each other the right to take all needful measures for the protection of those interests if threatened by the aggressive action of any power or by disturbances arising within China and Korea. If war was entered into by either of the contracting parties and any other Power, the second party to the agreement pledged itself to maintain an attitude of strict neutrality. In case, however, its ally was involved in hostilities with more than one Power, the other party would come to its aid and wage war and make peace in common. By linking itself with the leading power in the East and the greatest naval power of the world, Japan found its position immeasurably improved. From that time war with Russia was deemed by competent observers to be inevitable, though there was division of opinion as to whether the alliance with Great Britain was only a justifiable measure of self-defense taken in preparation for the conflict which Russian fatuity in Manchuria was bound to evoke, or whether it constituted a challenge and an irritation to Russia and a cause of war in itself.

The developments of the two years preceding the outbreak of hostilities in February, 1904, will be found under CHINA, KOREA, MANCHURIA, and especially RUSSO-JAPANESE WAR. Internal affairs after 1900 were largely concerned with party struggles (see POLITICAL PARTIES) and unsuccessful attempts on the part of the government to cope with the unhappy economic conditions that had followed the war with China. The Katsura ministry, which came to power in June, 1901, found itself confronted by the necessity of satisfying the general demand for the abolition of the onerous land tax instituted in 1898, and at the same time of providing means for the execution of a programme of naval expansion made necessary by the anticipation of war with Russia. A hostile Diet was dissolved in December, 1902, but the House which met in March of the following year was equally recusant. Through the intercession of Marquis Ito a compromise was finally concluded whereby in return for a reduction of the land tax the desired naval credits were voted. In the course of the year relations with Russia over Korea arrived at a critical stage. The Diet which met in December, 1903, expressed its disapproval of the government's conduct of the negotiations and was promptly dissolved. The new House met in March, 1904, after the outbreak of hostilities with Russia (February 8). See RUSSO-JAPANESE WAR.

The history of Japan since the Russo-Japanese War is largely concerned with two great problems, internal reorganization and immigration to the United States. The enormous cost of the war produced a financial stringency which had to be tided over, and the heavy taxes laid on industry aroused general discontent. Machine production has made rapid strides in Japan, which is now almost as highly industrialized as some of the European countries. The historic friendship between Japan and the United States has several times been strained on account of the question of Japanese immigration. Many Japanese laborers have come to the western part of America, mainly to the States of California, Washington, and Oregon. The white population of these States, particularly the labor unions, were bitterly opposed to the Japanese immigrants and demanded their exclusion by law, as in the case of the Chinese. In 1906 the school board of San Francisco ordered the segregation of Japanese children. This action was regarded by the Japanese as an insult to their race, and a note of protest was sent to the United States government. The sensational press of both countries began an agitation which threatened to rouse the war spirit of both peoples. Moreover, the American government was in a quandary, as it had no power to interfere with the regulations of the local authorities. Mayor Schmitz of San Francisco was called to a conference on the subject by President Roosevelt, and the latter was informed of the intense sentiment against the Japanese on the Pacific coast. A partial settlement was effected by the Japanese government giving an oral assurance that it of itself would restrict the emigration of Japanese laborers to the United States; the objectionable school ordinance was then withdrawn by the authorities of San Francisco.

Japan's emergence as a great Power made her a desirable ally. On Aug. 12, 1905, was signed the famous Anglo-Japanese alliance. Its object was (*a*) the preservation of peace in eastern Asia and in India, (*b*) the maintenance of the integrity of China and equal opportunities for trade among all nations, (*c*) the defense of the territorial rights of each in the regions of eastern Asia and of India; both were to act in common in case of an unprovoked attack or aggressive action. This treaty was renewed for 10 years on July 13, 1911, and a new clause was inserted that "should either High Contracting Party conclude a treaty of general arbitration with a third Power, it is agreed that nothing in this Agreement shall entail upon such Contracting Party an obligation to go to war with the Power with whom such treaty is in force." This clause was put in at the behest of the British government, which became alarmed at the possibility of being forced into a war with the United States on account of Japan. An oral assurance was also given by Japan that she would regulate the emigration of her laborers to Canada.

As a result of the Russo-Japanese War, the paramount interest of Japan in Korea was acknowledged. Great indignation was felt among the Koreans, for it foreshadowed their loss of independence. In 1909 Prince Ito, the famous Japanese statesman, was assassinated at Harbin by a Korean patriot who wished to avenge the wrongs inflicted upon his countrymen by the Japanese. In 1910 Korea was formally annexed to Japan and renamed Chosen, but the commercial rights of foreigners resident there were guaranteed for 10 years. An extensive conspiracy by Koreans against the Japanese government was laid bare in 1912, and many arrests were made. Of the 123 prisoners held for trial, 106 were sentenced to terms of imprisonment.

The heavy taxation necessary to maintain the army and navy and to pay for the war against Russia resulted in widespread discontent, particularly among the commercial classes, who continually protested against the ever-increasing drain upon industry. In the election of 1908 the Seiyu-kai (Liberal) party obtained an absolute majority in Parliament. As in Germany, the cabinet is responsible to the Emperor, not to Parliament. This was the first time that one party had a majority over all the others, and it was feared by the Conservatives that the principle of ministerial responsibility would be established. In order to prevent this, the Elder Statesmen interfered and ordered the appointment of Prince Katsura as Prime Minister, although he was a member of a small faction known as the Daido Club. The Katsura cabinet took office, promising fiscal reform in harmony with the desires of the commercial classes.

Japan's rapid transformation into a modern nation both politically and industrially brought into existence those revolutionary elements long familiar in Europe, Socialists and even anarchists. For the first time a conspiracy was formed against the life of the Emperor. A Dr. Kotoku and his wife with 12 others were secretly tried and executed in 1911. Twelve others were imprisoned for life. There was much criticism of the government because of the secrecy of the trial. On July 29, 1912, the Emperor Mutsuhito died and was succeeded by the Crown Prince Yoshihito, aged 33. The death of the much beloved Emperor produced great grief among all classes of the population.

The Japanese people have been trying fitfully to shake off the powerful grip that the Elder Statesmen have on the government. In 1913 there occurred a grave constitutional crisis. The Seiyu-kai party, having a majority in Parliament, introduced a resolution of "no confidence" in the Katsura ministry. Urged on by the Elder Statesmen, the Emperor asked that the resolution be withdrawn, but his request was refused. He then prorogued Parliament. A great popular demonstration was the result. Vast mobs collected in the streets, the police were attacked, and the offices of reactionary journals burned. Prince Katsura then resigned and was succeeded by Admiral Yamamoto, a popular naval officer, who promised economy and reform.

The Yamamoto ministry, although it came in on a wave of popularity, was not destined to live long. His naval estimate of February, 1914, was the highest of any year, and it was reduced considerably by both Houses of Parliament. A great naval scandal came to light, which showed widespread corruption among the naval officials in the purchase of supplies, particularly from the armament firms of Germany. Vice Admiral Koichi Fujii was found guilty of bribery and sentenced to one year's penal servitude. But more than all else, there was great dissatisfaction with the ministry because it had not sufficiently protected the rights of the Japanese in the United States. Count Okuma, an old Liberal statesman, succeeded Admiral Yamamoto as Prime Minister. It is significant that Count Okuma is a member of neither the Satsuma nor the Chosu clan, the aristocratic governing elements in Japan.

The relations between the United States and

Japan again became strained in 1913. In that year the State of California passed the alien land ownership law, which excluded from the right to own land all aliens who were not eligible to American citizenship. It was directly aimed at the Japanese, as they are prohibited from becoming naturalized citizens in America. The government of Japan protested vigorously against this discrimination, declaring that the law violated the Treaty of 1911, which guaranteed equal treatment to the citizens of each country. President Wilson, aided by Secretary of State Bryan, made every effort to prevent the law from being passed, but was unsuccessful. See California.

The Great European War of 1914 brought Japan into the fray. As an ally of Great Britain, Japan issued an ultimatum to Germany ordering her to evacuate Kiaochow within a week. There are several reasons for the Japanese dislike of the Germans. It was Germany who got up the combination of the Powers that ordered Japan out of Port Arthur after her victorious war with China in 1895. It was Kaiser Wilhelm II who first raised the cry of the yellow peril and so raised up a popular feeling against the Japanese. The German government refused to comply with the ultimatum, and war was declared against Germany by Japan, in order "to protect British commerce in the eastern seas." Germany's stronghold in the Far East was the powerful fortress of Tsingtau on the German leased territory of Kiaochow in China. The fortress was attacked by Japanese and British warships and a landing expedition of 50,000 Japanese troops. After a most gallant resistance of 11 weeks the Germans surrendered on Nov. 7, 1914. The Japanese government assured the United States that her intentions were not detrimental to American interests and that she intended to give back Kiaochow to China. See War in Europe.

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JAPANESE ART. The history of Japanese art, as distinguished from Japanese archæology, begins with the introduction of Buddhism in the sixth century A.D. Along with the new religion came the knowledge of Chinese ideographs (word characters) and the art of the calligraphist that creates them. In Japan, as well as in China, the manual dexterity attained early in life by the use of the brush influences profoundly the manner and method of expression of artists. In both countries painting is often regarded as a mere branch of calligraphy, and both arts are similarly classified according to the nature of the brush strokes. Indispensable to the painter who would acquire a high position in the world of art are complete mastery and consistent use of a definite style of brushwork. In every painting, print, sculpture, or chased bronze, the Japanese connoisseur looks first of all for individuality of expression, the trace of the living hand of the master. While Japanese art inherits from Chinese, just as Renaissance inherits from Roman, it is interesting to note that all inherit from Greek. The Buddhist art that Chinese pilgrims carried back with them from India to the Far East was still in a measure under the influence of the Greek civilization introduced centuries before by the successors of Alexander the Great. In many an ancient Japanese idol may be found a faint echo of Hellenistic art of the third century B.C.

Painting. Japanese paintings are of three different forms—the *kakemono*, the *makimono*, the *gaku*. The kakemono is a tall hanging picture for display on the wall, either singly or in sets of two or three. It is mounted on brocade or paper, at the lower end of which is an ivory-tipped stick around which it is rolled when not on exhibition. The makimono is a specially long roll for the presentation of processions, combats, and serial pictures. The gaku is a picture framed flat but not glazed. Of Japanese kakemonos there exist records and specimens in almost unbroken continuity from the ninth century on. Even of seventh-century paintings there still exist examples, notably the one on the wall of the Kondo in the Horiuji Temple at Nara. With Japanese painters it has always been an axiom to keep materials as much in the background as possible. They work on a surface of ribbed silk or of flat paper, with a brush full of color that does not admit timidity or error. The effect in each picture is confined to narrow limits (usually to a single expression) and is produced with a minimum of manual labor and extreme economy both of line and surface. The principal schools of Japanese painting are:

1. *Chinese* and *Buddhist*, dating from the sixth century—the former relying on feats of calligraphy, in black and white or dull tones, and intended for the highly cultivated classes; the latter gorgeous in gold, polychrome, and mounting, to attract the masses. The Buddhist subjects were almost entirely religious; the Chinese included history, legend, mythical zoology, landscapes, animals, birds, and flowers, all fashioned after Chinese models.

2. *Yamato* and *Toza*, dating from the eleventh century—Chinese in basis, but executed with a lighter touch and with decorative coloring, and having subjects commonly connected with Japanese history and legends and court ceremonials.

3. *Kano*, founded by Kano Monotobu (1476–1559), who was contemporary with Raphael and was skillful equally at figures, landscapes, birds, and flowers. His grandson Eitoku was distinguished for boldness of design and brilliancy of coloring. Among the most original of his successors was Tanyu.

4. *Ukiyoye*, founded by Iwasa Matahei (1577–1650), who deserted mediæval and aristocratic subjects for contemporary scenes and figures, corresponding to our genre paintings. Among his numerous successors were Moronobu (1624–95), Chosun (1682–1752), Harunobu (1718–70), Shunso (1726–92), Kiyonaga (1742–1815), Utamaro (1754–1806), Toyokuni (1769–1825), Hokusai (1760–1849), Hiroshige (1797–1858).

5. *Korin*, named after the great artist—a style that originated with Koyetsu (1552–1637),

aimed at an imaginative treatment of nature unfettered by the formalities of the Kano school, and achieved extraordinary decorative values.

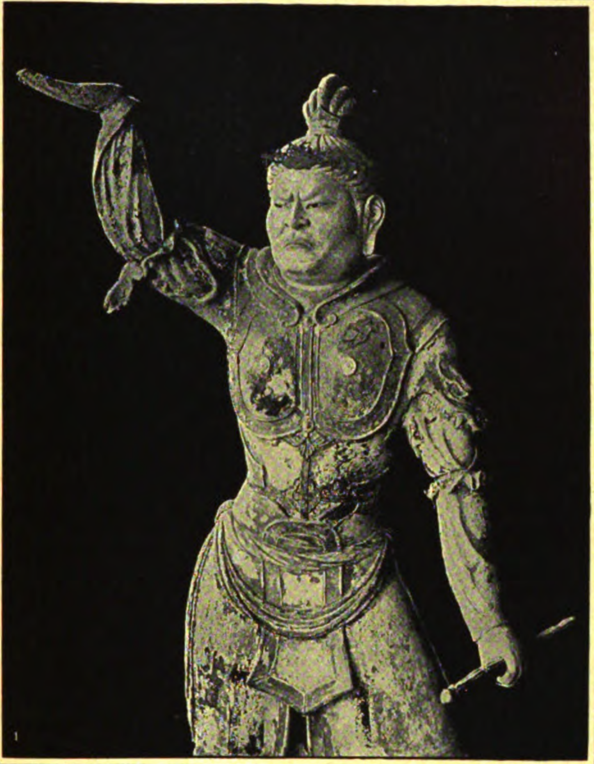
6. *Shijo*, a naturalistic school dating from the eighteenth century, named from the street where stood the studio of the founder, Okyo (1733–95), who revolutionized the laws of painting in Kyoto, working closely from nature and preferring washes and quiet tones to sharp lines and strong body colors. Noted masters of the school are Goshun, Sosen (famous for his monkeys), Hoyen, Ganku, Ippo, Gosai, Kuburo, Zeshin.

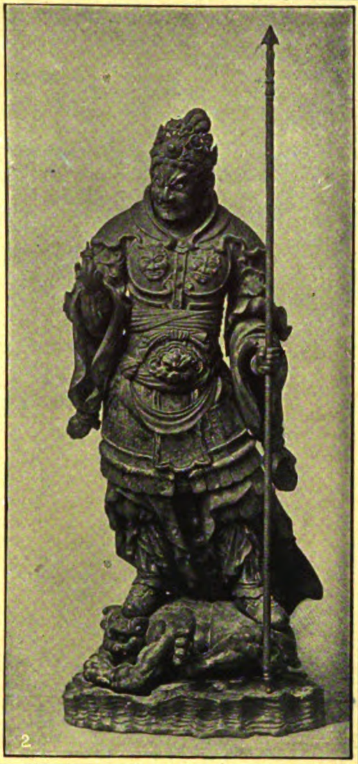
Color Prints. Printing from wooden blocks was practiced by the Chinese centuries before it was known in Europe, and Japanese prints are extant dating from the thirteenth century. But Japanese color prints of the kind now familiar to Europeans and Americans were originated in the middle of the seventeenth century by Hishigawa Moronobu and used for the multiplication of Ukiyoye pictures. Moronobu was the son of an embroiderer and began life as a pattern designer. There had been woodcut illustrations to books before, but Moronobu was the first to publish picture books and single prints, in which the text was quite subsidiary. On Moronobu's prints the outline alone was stamped, the color being applied afterward with the brush. His pupil Kiyonobu (1663–1729) began to apply the color also from blocks, at first rose and green only. Harunobu increased the number of blocks to complete the design with background and atmosphere. He is one of the most seductive artists of Japan, presenting delightfully and delicately the maidens and matrons of his native land. His color is distinguished for force and variety—tender tones of gray, rose, and soft yellow; but also rich apple green, crimson, and chocolate red. Koriusai continued Harunobu's work so closely that their work is often hardly to be distinguished. Shunso produced an infinite array of actors in character. Kiyonaga pictured wonderfully the out-of-door life of Yeddo, its processions and festivals, the countless ceremonies of the New Year, music parties in house boats on the river, and wonderful night scenes. Utamaro is distinguished for strength in figure drawing and versatility of invention. His famous triptych of "Awabi Fishers" is one of the great classics of color printing, and his sets of prints illustrating the life of the strong boy Kintoki have few equals. Kuniyoshi preferred heroic subjects, the feats of old Chinese warriors, the deeds of the Forty-seven Ronins, the civil wars of the Middle Ages. The most various and most puissant spirit of all was Shunso's pupil, Hokusai, who produced a wealth of masterpieces in landscape, and a few great figure subjects in which were concentrated wide knowledge of humanity, mastery of the human form, and extraordinary resource in composition. Under the name of Shunro, Hokusai produced graceful prints in his master's style. Then, quarreling with his master and being expelled from the studio, he lived for a time from hand to mouth, designing New Year's cards or even peddling small objects through the streets. He was marvelously industrious but equally improvident. During the 90 years of his life he changed his residence 93 times, finding it easier to move, it is said, than to clean house. At the age of 75 he signed himself "The Old Man with a Mania for Drawing," but his thoughts were all of the future. "When I am 80," he wrote, "I shall know more; at 90 I shall have got to the heart of things; at 100 I shall be a marvel; at 110 every line, every blot, of my brush will be alive." On his deathbed he sighed, "Five more years and I should indeed have become a painter." The prints made from his paintings, published in 15 volumes, display a vast range of observation. Mountains, rivers, trees, birds, fishes, animals, insects, breaking waves, flowers, rocks, ships, buildings, utensils, men and women at all kinds of occupations, comic and fantastic figures; even gods, saints, heroes, warriors, dragons, and fabulous beasts, all take life under his restless brush. The sets of prints on which his fame chiefly rests are the "Thirty-six Views of Fuji," the "Bridges," the "Waterfalls," the "Hundred Poems Explained by the Nurse," the "Ten Poets of China and Japan." The landscape work of Hokusai, forming almost an illustrated guidebook to the famous views and favorite resorts of Japan, was continued by Hiroshige, who is less elemental but more full of charm, and whose influence on European painting has been wider than that of any other Japanese painter. Hiroshige gives us exquisite impressions of twilight, mist, moonrise, snow, and fireworks. It is a Hiroshige motive that Whistler presents in "Battersea Bridge."

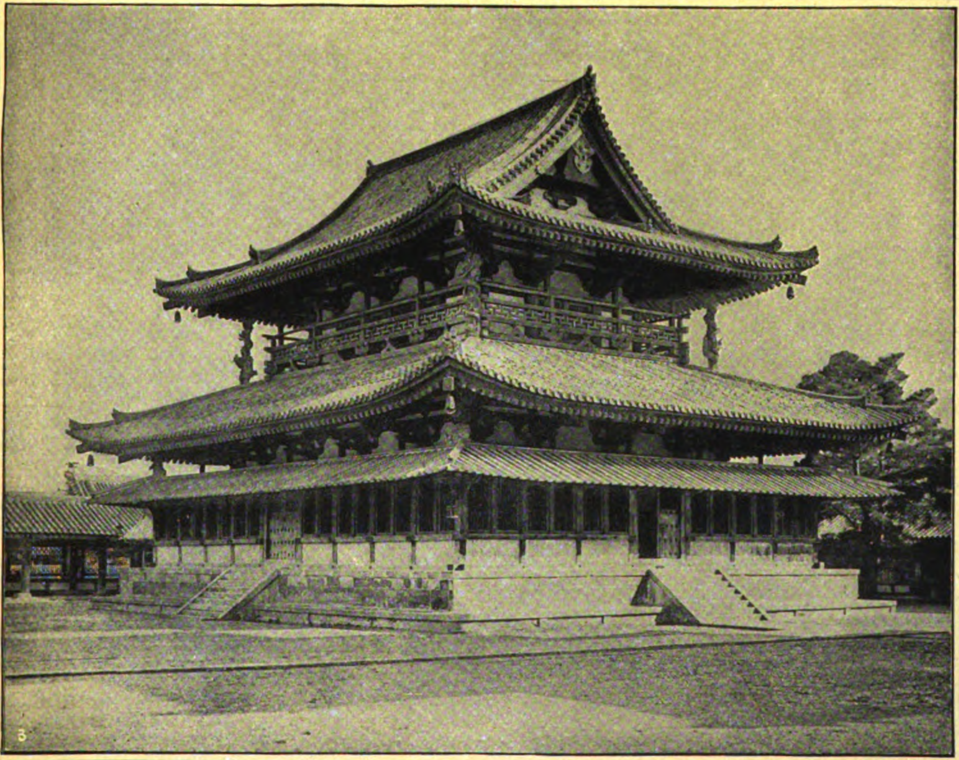
FROM THE KWA-CHO GWA-JO (FLOWERS AND BIRDS ILLUSTRATED).

Sculpture. Beginning with the sixth century,

JAPANESE ART







1. **TERRA COTTA STATUE,** polychromatic, at Todeiji, near Nara. VIII Century.
2. **WOODEN STATUE,** polychromatic, half life size. XII Century.
3. **THE HONDO** (Chief Temple) of Horiuji, Yamato. VII Century.

Japanese sculptors expressed themselves in wood and metal, but seldom used stone. Noteworthy are the wooden statues dating from the eighth century, preserved at Nara, portraying the Indian Buddhists, Asangha and Vasabandhu, in dignified pose and with stately lines; and the eleventh-century colossal temple guardians of the great gate of Todaiji. The most perfect of the ancient bronzes is the great image of Bhaicha-djyaguru in the temple of Yakushiji at Nara, attributed to a Korean monk of the seventh century. From an early period the ornamentation of arms and armor was elaborate, reaching its height in the twelfth century in the armor of the Japanese Bayard, Yoshitsune, that is still preserved at Nara. In the latter half of the fifteenth century began the elaborate decoration of swords with engraved metal guards (tsubas) often inlaid with gold and silver. During the seventeenth century the use of tobacco became common, and a kind of button or toggle (*netsuke*) was employed to fasten the pouch to the girdle. The love and expense that the gentry bestowed upon sword hilt and guard were devoted by commoners to pipe and netsuke. The name *okimono* is applied to carved animals and decorative objects in metal, wood, and ivory, not having any special use or value.

The Japanese name for bronze, *kara-kane* (Chinese metal), shows whence came knowledge of the alloy. From an early period the Japanese bronze casters have understood how to model in wax and how to employ a hollow removable core, although making colossal statues like that of Lochana Buddha at Nara, 138 feet high and weighing 550 tons, in sections in situ. In the production of rare and exquisitely beautiful patinas the Japanese are unexcelled.

PAGE FROM THE GWA-FU (COLLECTION OF STUDIES) BY HOKUSAI.

Textiles. Japanese textiles are by no means equal to those of the Chinese. No pile rugs or tapestries of great merit have come down from antiquity. Some of the modern brocades and velvets and embroideries are masterpieces of ingenuity and patience, but by no means to be classed decoratively with the great Chinese and European classic examples. The modern Japanese imitations of Gobelin tapestries made at Kyoto, though praised without reservation by some critics, are unworthy to be named in the same breath with the great products of French-Flemish looms. For Japanese lacquer and ceramics, see LACQUER WORK; POTTERY; PORCELAIN.

Architecture. As compared with that of China, the architecture of Japan is less massive, the great overhanging curved roof forming the chief motive of the design, which, even more than the rounded and swelling cupola in a domed church of Europe, gives character to the whole. The common use of timber even for buildings meant to be, and sufficiently proved to be, very lasting has deprived Japanese architecture of the monumental possibilities of wall, colonnade, and arch. The building of the country is therefore timber construction very like in principle to that of mediæval Europe, but more dignified than that, because there was in the Eastern land no overmastering style of masonry architecture, like that of the vaulted buildings of Gothic or of neoclassic type, to restrain its development. Whatever was to be done, architecturally speaking, in Japan was perforce done with the trees of the mountain forests; whereas in Europe wood was in general employed only for the less important and less monumental structures. The result of this is that the architecture of Japan seems to a European rather uniform in character, but a profounder examination shows divergences as great in the different forms and characteristics of Japanese buildings as we find in the buildings of any European land. The difference from century to century is less, however; and this because of the admitted slowness of all change among Asiatics, and also because of the deliberate action of so many rulers of Japan in keeping new foreign influences away from the land. In detail there are one or two exceptional characteristics which result from the custom of building in wood and framework. This framework has its own necessary characteristics; and these are heightened and emphasized by the use the Japanese have made of them. Next to the broad eaves and the exquisitely subtle concave curves of the roofs, one notices the effective use of multiple bracketing of great ingenuity. Very effective also is the decorative treatment of metal holders for the points of support and the points where one timber is secured to another. Just as the floor beams in European buildings are often hung in "stirrups" of wrought iron, so in Japan a metal mount especially affected to the purpose will mark the insertion of one timber into another, the crossing of two timbers of equal size, and also the base and top of a pillar, whether of wood or, as sometimes happens, of stone. The interior of the often represented Phœnix Hall of the Shoguns of the Fujiwara race reigning in the eleventh century of the Christian era has retained almost unchanged the beautiful interior effect produced by this system of construction in wood and metal. These metal mounts are often exquisitely ornamented and gilded in different hues of gold. The wooden members which they strengthen and adorn are lacquered in rich and deep colors, superbly finished. All the framing is executed with extraordinary precision and elegance both of design and fitting.

The chief monuments of Japanese architecture are temple groups, consisting in many cases of a pagoda, temples, halls, and gates; but in others the pagoda is wanting. These groups are built on terraces approached by stairways and planted or surrounded with flowers, trees, and shrubbery. Probably the oldest is the group of Horiuji, near Nara (593 A.D.); that of Yakushiji (680) is even more celebrated. At Kyoto, another important monastic temple centre, are examples of a later and more magnificent style, lacking the charm of the early simplicity. The great monastery of Obaku-san is the finest example of the Zen temple architecture of the Kamakura period, during which loftiness came to be sought after in the interior design; while the Iyeyasu shrine and the temple groups at Nikko display the final flamboyant gorgeousness of the style in its early decline, which began under the Tokugawa dynasty, after 1603. The modern architecture of Japan in part retains the old traditions, but these tend to decay before the persuasive and destructive influence of Western models.

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JAPANESE BEAR. See BEAR.

JAPANESE DEER. The name in England, where this deer has been introduced into parks, of the sika (*Cervus sika*). See SIKA.

JAPANESE LANGUAGE. The most important member of a very small family of languages. Its nearest relatives are Luchuan and the languages spoken in the little islands which lie between Japan and Loo-choo. On the Asiatic continent Korean resembles it in grammatical structure and more remotely in etymology. It is not related to Ainu or to Chinese. Efforts to find other members of the family and to establish more distant relationships have been made in various directions, but with little success. It is called, somewhat vaguely, Altaic; but the identifications are not very convincing, and the results thus far cannot be regarded as scientifically established.

Characteristics. Words and inflections are often formed by loosely joining words and parts of words to other words, and so the language is described as agglutinative. Native grammarians divide its words into two classes, uninflected and inflected. The former includes nouns, pronouns, numerals, postpositions, and some adjectives which are really nouns. The inflected words are most of the adjectives and verbs. Nouns do not distinguish gender, number, or case. The apparent exceptions really conform to the rule, for when the distinction of sex is imperative it is formed by using a special word, and when number must be indicated there is reduplication or the use of words signifying number. There are no personal pronouns; but when, in exceptional cases, a pronoun is required, certain nouns are used which retain in common conversation their ordinary meanings. Relative pronouns are wholly wanting, the relative word or clause being placed before the word qualified, as we may say "the murdered man" for "the man who was murdered." There is no article, and our prepositions are represented by postpositions, the latter having certain uses which have no equivalent in European prepositions. The verb also, in some of its aspects, differs widely from the verb in languages more familiar to ourselves. It is conjugated in three tenses, past, present, and future, but in a wide range of moods—probable, conditional, concessive, frequentative, imperative. It has, however, neither number nor person, and, one might also add, it has only the present tense; for its past tense denotes primarily certainty and is used, therefore, sometimes of the present and even of the future. The future denotes uncertainty and is used therefore sometimes of the present and even of the past. The past tense is used in its ordinary sense of past time when the emphasis is upon the tense, but often a second verb is introduced in the present showing that it is the dominant point of view, as if one should say "Is it that you have been in Russia?" The moods differ from our own. There is no infinitive, and there are forms not found in our ordinary conjugations—concessive, desiderative, hypothetical, and the like, with negative forms corresponding throughout. The terminations are other verbs, fragments of verbs, or postpositions. Most adjectives are conjugated like verbs, and the adverbs are adjectives with a certain termination. Adjectives are in the positive degree only, though sometimes comparison is indicated by a word corresponding to "than," and the superlative by various words signifying "most." The lack of distinctions of persons is made good in part by the use of honorific prefixes, suffixes, and words which themselves convey differences in the degree of estimation in which persons and things are held. Conjunctions are in part postpositions, and in part they are supplied through inflections of the verb. Two sets of numerals are employed, the Chinese and the native Japanese, but the latter extend only to 10. Auxiliary numbers are common. Similar numerals are used sparingly in English, as sheets of paper, blades of grass, head of cattle, and the like; but the Japanese use such expressions lavishly, certain ones applying to whole classes of objects, so many long, round ones, so many flat ones, and as the usage is fixed a mistake in a numeral produces, as indeed in English, a ludicrous effect. In pronunciation the vowel sounds closely resemble the Italian, and the consonants can be represented by the English letters, *l*, *q*, *v*, and *x* being wanting. In diphthongs each vowel retains its separate value. In many instances "clear" consonants, i.e., surds, are changed to "muddled," i.e., sonants. Syllables are open, and accent is so slight that it may be disregarded. The chief rule of syntax is that the qualifying word or clause precedes the word or clause qualified. The verb is last in the sentence, and as a sentence is supposed to contain a complete statement, however complicated, the mind is often held long in suspense. Most affirmations are without true subjects, active verbs being employed often without a subject, the tendency being to remark "with reference to" somebody or something. It follows that the distinction between active and passive voices and verbs is not precisely the same as in other languages.

The Spoken and Written Forms. The language differs in grammatical forms and in vocabulary in its spoken and written forms, making a twofold series of grammars and dictionaries necessary. In the written language there are also marked distinctions—the archaic, classical, Sinico-Japanese, epistolary, etc. The oldest specimens we have go back to the eighth century A.D., but they are unintelligible to all but special students. At a still earlier period the Chinese language had already influenced the Japanese, and many Chinese words are embedded in the Japanese, disguised and naturalized. But from the ninth century onward Chinese has been the language of the learned, taking the place of Latin in Europe. The talk of educated men is unintelligible to the common people, so full is it of Chinese words and phrases. In our day the use of Chinese has increased, since its monosyllables offer unequaled facilities for the coinage of scientific terms, and the whole terminology of modern science has been translated into Chinese compounds by the Japanese. The result is mystifying to a Chinaman, because of the unfamiliar use and collocation of the ideographs, as well as from the retention of the order of the Japanese sentence and its grammatical structure in the ordinary written styles. The pronunciation, too, of Chinese in Japan is traditional, derived from teachers who spoke dialects which have ceased to exist in China. Unfortunately there are two traditions and both in use, complicating a situation which has inherent difficulties enough.

As the Japanese had no writing previous to the introduction of Chinese, the Chinese ideographs are used phonetically, as well as for the expression of ideas. Thus, in Japan names are written with the ideographs without regard to the meaning implied, and originally pure Japanese literature was thus written, certain ideographs being associated with definite sounds. But the result was cumbersome in the extreme, the long, polysyllabic Japanese words not lending themselves to this treatment. In course of time the ideographs were abbreviated and finally took on the form of the *kana*, the syllabary. It is in two forms—the *katakana* and the *hiragana*, the former used chiefly for names. The katakana are fashioned out of the square or book form of Chinese characters, the hiragana from the cursive. The kana, for mnemonic purposes, is arranged in two orders—one composing a verse of Buddhist poetry written by Kōbō Daishi (q.v.) which sets forth the vanity and brevity of life, and the other the table of "50 sounds," though there are really but 47. For convenience in transliterating Chinese, however, a letter representing *n* has been added. All purely Japanese words and syllables end with a vowel sound. The kana is thus used as an alphabet, representing syllables instead of consonants and vowels. By the change of surds to sonants in certain instances, and by the distinction of long and short vowels, the number of syllables is considerably increased.

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JAPANESE LITERATURE. The literature of Japan falls into three groups corresponding to three periods in the nation's history.

The first represents primitive Japan still feeling foreign influence but slightly. The literature is in archaic Japanese, though already Chinese words and marks of Chinese civilization may be detected. The traditions, hymns, and prayers of Shinto (the way of the gods) came from immemorial antiquity by oral tradition and were reduced to written form in the beginning of the eighth century A.D. The *Ko-ji-ki* (Record of Ancient Matters) is the most important member of this group and perhaps the most important work produced in Japan. It has been called the Bible of the Japanese, although it contains neither doctrine nor ethics. It is a mass of loosely connected and fragmentary legends and annals, setting forth the history of the world, i.e., Japan, from the Divine Age, the beginning. Its first trustworthy date is in the middle of the fifth century A.D., but its materials become scanty in proportion to their historic trustworthiness. The book, however, contains most valuable matter for the critical scholar, being his most important source for the reconstruction of ancient Japan. Even in the eighth century Japan was feeling the mighty influence of the Chinese civilization, and thenceforth scholars studied its language and literature, while they left pure Japanese to romance and poetry and trifles, the amusement of women, and of men in their lighter moods. Archaic Japanese, already unintelligible, gave way to classical forms, and women furnished the models of literary style. This literature reached its culmination in the capital, Kyoto, in the ninth and tenth centuries. It reflects the elegant, trifling, and immoral life of the court in romances which show the customs and manners of the period accurately and tediously. The novels are strings of incidents without unity or attention to the relation of character to event, with supernatural marvels interspersed, and palace intrigue as the chief interest. The poetry is more attractive from its curious unlikeness to other verse. It has neither rhyme nor quantity nor parallelism, but consists simply of alternate lines of five and seven syllables, the usual "poem" containing 31 syllables in all, two pairs of five and seven, with a final seven added. A few poems are longer, and a later form restricts the syllables still more severely to 17. But even within these narrow limits room is found for "pillow words," mere ornaments without significance used as "rests" for other words. The subjects are as few as the syllables —birds, flowers, mountains, the moon, the rain, and snow, the autumn leaves, the wind, and other themes associated with them. Often the verse merely hints a picture which the reader's imagination must complete. There are travels, too, and diaries, and miscellanies filled with reflections and fancies. After the tenth century few additions of value were made to this literature. It continued to be cultivated, but it revolved around the same trite subjects, imitated the same models, and was capable of no further development. In the seventeenth and eighteenth centuries a group of scholars attempted to revive the ancient faith, Shinto, in its pure form. As a part of their endeavor, they wrote in pure Japanese, attempting to exclude all Chinese elements; but the literary fashion never extended very far, nor did it produce important results. In modern times a vast formless literature has been created for the masses, for the greater part novels, in the colloquial or in a simple written style paying little attention to the canons of classical Japanese literature. Naturally it is ignored by educated men.

Doubtless even the first collections of traditions and rituals were made because Chinese influence was already powerful, and they were put in written form only by the aid of Chinese ideographs. Buddhism won Japan in the sixth and seventh centuries A.D. and brought with it Chinese civilization. Henceforth Chinese literature in form and matter was supreme. The *Ko-ji-ki* was given its written form in archaic Japanese in the year 712 A.D., and it was followed in the year 720 by the *Nihongi*, which covered much the same ground, but was written in Chinese. As Rome in language, ideals, philosophy, law, and literature ruled Europe in the Middle Ages, so did China influence Japan. The Chinese classics were the models of style, as they were the unquestioned authority in religion and morals. Buddhism brought its voluminous works, historical, doctrinal, sectarian, polemic, exegetical, philosophical, with it, and the Japanese set themselves to master and appropriate these riches. Nothing new of importance was produced, if we except possibly the canonical writings of the Shin sect, which is accounted heretical by all the rest and as a matter of fact denies what Buddha affirmed and for the most part affirms what he denied. From the twelfth century until nearly the end of the sixteenth century Japan was tormented by feudal strife. Letters were cultivated by monks, and even in the seventeenth century it required an argument to persuade the higher classes that letters were for others besides priests. With the final restoration of peace under the Tokugawa family (1603–1868) there was a revival of learning. China again gave the impulse, but it was no longer the Buddhistic China of the sixth century, for the literati had by this time rejected the Indian faith and had set forth Confucianism as a fully developed philosophy and cosmogony. Introduced into Japan in the beginning of the seventeenth century, this was thenceforth the religion of the higher classes, and Buddhism was left to priests, women, and the ignorant masses. But, as before, Japan added little to the controlling ideas of the new learning. It imported the varying schools of Chinese thought, fought over anew the same battles with the same arguments and illustrations, but there was no native development. Chinese language, history, literature, and poetry furnished models which satisfied all literary needs. Yet it was not mere copying, nor was the change wholly superficial, for the two empires are animated by different spirits, and these are shown in their respective literatures, so that Sinico-Japanese is entitled to a place by itself and is something more than a mere branch of the greater literature of its more original neighbor.

Again in the present age Japanese literature has undergone a transformation. The style itself has changed, though still held in the bondage of the Sinico-Japanese; but newspapers and reviews with the popularization of knowledge no longer permit the maintenance of the rigid standards of the past. Besides, the acquaintance with the whole range of Chinese literature which the older forms presupposed no longer exists except for specialists. As in the seventeenth century the orthodox Confucian philosophy supplanted the earlier Buddhist teaching, so now have Chinese literature and history given way before the history, philosophy, ethics, theology, romance, poetry, and, above all, science of the Occident. Judging from the past, we may expect vigorous assimilation of Western literature, and its transformation into forms congenial to this people, who, hospitable to ideas from foreign lands, know how to impress themselves upon the importations and amid all changes to preserve the spirit of Old Japan. See Anthology.

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JAPANESE MUSIC. The music of Japan is almost identical in form with that of China. From the fifth century, when Korean musicians introduced the stronger, more elaborate type, Chinese music has dominated, except in the temples where the priests still preserve the older forms. The only instruments indigenous to the island are the "Yamato" koto, a stringed instrument of 13 strings with a compass of two and a half octaves (pentatonic), and the "Yamato" flute. The few others employed are merely softened modifications of Chinese instruments. From time immemorial the national music has been handed down by certain chosen families, and it is this spirit of conservatism as much as the poverty of their musical instruments which has prevented any original development in Japanese music. In addition they are hampered by a lack of systematized notation, a scale derived from the Chinese, and the unvaried use of common time. The most noticeable characteristics are an extensive use of chromatics, the monotony of their melodies, and the prevalence of the minor key. It is of interest to note that the national hymn was composed by an emperor and written by an empress in the seventh century. Consult: P. T. Piggott, *The Music and Musical Instruments of Japan* (London, 1893); C. Leroux, *La musique classique japonaise* (Paris, 1910); A. Westarp, *Japan Ahead in Music* (London, 1912). A collection of music for koto, both in Japanese and European notation, was published by S. Isawa, at Tokyo in 1888. See also Chinese Music; Koto.

JAPANESE PERSIMMON. See Persimmon.

JAPANESE POLITICAL PARTIES. See Political Parties, *Japan*.

JAPANESE ROBIN. A dealer's name for one of the East Indian hill tits (q.v.), frequently kept as a cage bird.

JAPANESE SPANIEL. See Spaniel.

JAPAN′NING. The art of giving a coating of varnish and other materials to certain manufactures, by which a glossy surface is produced. The varnished articles are usually submitted to a high temperature in an oven in order to harden the coating.

JAPAN SEA, Battle of the. See Russo-Japanese War.

JAPAN VARNISH TREE. A Japanese tree which furnishes a varnish. See Sumach.

JA′PHETH. According to Gen. x. 2–5, the youngest son of Noah, the brother of Shem and Ham, the father of Gomer, Magog, Madai, Javan, and Tiras. These are clearly the eponymous ancestors of ancient peoples; and three of them —Gomer, Madai, and Javan—unquestionably represent the Cimmerians, the Medes, and the Greeks. Magog (q.v.), or perhaps originally Gog, seems to have been the name of some Scythian people in the wider sense of the term, and Tiras probably refers to the Tyrrhenians, or Etruscans. Gomer's sons are said to be Ashkenaz, Riphat, and Togarmah. Ashkenaz (see Ashkenazim) is the Hebrew form of the Assyrian Ashkuza, the Scolotian Scythians; Riphat is supposed to be the Phrygians, but that is doubtful, as is also the identification of Togarmah as Armenians, or Tilgarumu. The sons of Javan are Elisha, Kittim, Tarshish, and Rodanim. Elisha may be Alashia and represent the Greeks on Cyprus; Kittim may be the Macedonians; Tarshish the Tartessians in Spain or the Dorians around the Etrurian Sea, and Rodanim, which is the probable reading, the Rhodians. The grouping of these peoples together as descendants of Japheth is evidently later than the oracles of Noah in Gen. ix. 25–27, in which the three brothers are Shem, Japheth, and Canaan, who appears as the youngest. Shem here seems to represent a congeries of Hebrew tribes, such as Israel, Judah, and probably Moab, Ammon, Edom, Jerahmeel, Kenaz, Cain, and others. Canaan clearly included a group of kindred Syrian peoples; and Japheth is likely to be the name of the Philistines, the Cherethites, the Pelethites, the Zakkalians, and others. These Japhethites probably came for the most part, as is certainly the case with the Philistines and the Cherethites, from Crete.

Canaan is cursed—let him become a slave of his brothers; Shem is blessed; Japheth also receives a blessing—let the Canaanites be enslaved by Japheth as well as by Shem. The present text reads: "let Japheth dwell in the tents of Shem." That could scarcely mean anything else than a wish that the Japhethites might drive the Shemites out of their dwelling places and occupy them. Such a wish is inconceivable; and it is therefore probable that the original text read: "let Japheth dwell in the tents of Canaan." Such an oracle must be earlier than the invasions by the Philistines of the territory occupied by Israel and Judah. Since the Philistines are first mentioned as falling upon Egypt c.1200 B.C., and they appear to have settled upon the coast of Syria after their defeat by Rameses III (1200–1169), the song is likely to have originated in the twelfth century B.C.

Later some of these terms took on a wider significance. Canaan did not lend itself to expansion; it was naturally limited to Syria. Ham took the place of Canaan as the son of Noah. Shem came to include a number of peoples rightly or wrongly supposed to be akin. Japheth was made the ancestor not only of the nations who had invaded Syria from Crete, but of their assumed kindred. The real kinship of Cimmerians, Scythians, Medes, and Greeks cannot be questioned. As for the Etruscans, if they are indicated by Tiras, their genetic relations have not yet been definitely determined. Japheth is no doubt identical with Iapetos, the father of Prometheus; and there is probably also a connection between Kaphti (Cretan) and Japhti (Japhethite) as well as between Japheth and Joppa. Consult Görres, *Die Japhetiden* (Regensburg, 1845); Knobel, *Die Völkertafel der Genesis* (Giessen, 1850); Eduard Meyer, *Die Israeliten und ihre Nachbarstämme* (Halle, 1906); Nathaniel Schmidt, "The Blessing of Japheth," in *Journal of Biblical Literature*, vol. xxxv (Boston, 1915); and the commentaries on Genesis by Dillmann, Gunkel, Driver, and Skinner.

JA'PHET IN SEARCH OF A FATHER. A novel by Captain Marryat (1836).

JAPIKS, jä'pĭks, GIJSBERT (1603–66). A Frisian poet, born at Bolsward. His father was a burgomaster, and the son after an excellent education became schoolmaster at Bolsward (1634). In his hands the West Frisian dialect again became a literary tongue. From the French he translated in prose several poems, and he also published versions of the Psalms. His own writing was marked by originality, feeling, and lyric beauty. The *Friesche Rymlerye* was first published in 1668; the edition of Epkema (Leeuwarden, 1821) is supplemented by a grammar and vocabulary (ib., 1825). Consult Halbertsma, *Hulde aan Gijsbert Japiks* (Bolsward, 1824–27).

JAPURÁ, zhä'pōō-rä'. A river in Colombia and Brazil. See YAPURÁ.

JAQUES, jäks *or* jäks, on the stage often pronounced jā'kwēz, *Fr. pron.* zhȧk. 1. A contemplative character in Shakespeare's *As You Like It* ("the melancholy Jaques"). 2. A son of Sir Rowland de Bois in *As You Like It*. 3. A miser in Ben Jonson's *The Case is Altered*.

JARARACA, zhä'rȧ-rä'kȧ (Portug., from the native name). A venomous crotaline serpent (*Lachesis jararaca*), widely distributed over tropical South America and closely related to, if not identical with, the bushmaster (q.v.) or labaria, which it resembles in colors and manner of life.

JARCKE, yär'ke, KARL ERNST (1801–52). A German jurist and conservative publicist. He was born at Danzig and studied at Bonn and Göttingen. In 1824 in Cologne he became a member of the Roman Catholic church after having been professor at Bonn. At Berlin in 1825 he became connected with the university as lecturer and founded the *Politisches Wochenblatt* (in 1831). In 1832 he went to Vienna as Court and State Councilor and as instructor of the Princes of Nassau. Among Jarcke's works are: *Handbuch des gemeinen deutschen Strafrechts* (1827–30); *Die französische Revolution von 1830* (1831, anonymously); *K. L. Sand und sein an Kotzebue verübter Mord* (1831); *Die ständische Verfassung und die deutschen Konstitutionen* (1834); *Vermischte Schriften* (1839–54). With Phillips and Görres he founded in 1839 *Historisch-politische Blätter*.

JARDIN D'ACCLIMATATION, zhär'däɴ' dȧ'klē'mȧ'tȧ'syôɴ' (Fr., garden of acclimatization). A garden of 50 acres forming part of the Bois de Boulogne in Paris, designed to acclimatize foreign plants and animals suitable for domestic or ornamental purposes. It contains, besides buildings for the various animals, a permanent exhibition of articles connected with gardening, a dairy, an aquarium, greenhouses, an aviary, a winter garden, establishments for fattening poultry and rearing carrier pigeons, and several cafés. The garden, which was greatly damaged in 1871 during the siege of Paris, is a favorite resort.

JARDIN DES PLANTES, dȧ pläɴt (Fr., garden of plants). A botanical and zoölogical garden in Paris, founded at the beginning of the seventeenth century. It was at first called Jardin du Roi.

JARDINE, jär'dĭn, SIR WILLIAM (1800–74). A Scottish naturalist, born in Edinburgh and educated at its university. He succeeded his father in the baronetcy at the age of 20. Ornithology was the first of the natural sciences to claim his attention, but he went on to the study of fishes, monkeys, felidæ, pachyderms, and ruminants, writing himself 14 volumes on these subjects and on birds in a series of books which he edited called *The Naturalist's Library* (40 vols., 1833–45). Sir William made a collection representing 6000 species of birds, was a commissioner on the salmon fisheries, member of the British Association, and author of a *Calendar of Ornithology* (1849); *The Ichnology of Annandale* (1853); *British Salmonidæ* (1861); *The Birds of Great Britain and Ireland* (4 vols., 1876).

JARDIN MABILLE, zhär'däɴ' mȧ'bēl'. A former very popular resort in Paris, founded in 1840 by a dancer, Mabille. It was a favorite gathering place of the demimonde, and with its brilliant illuminations, fountains, flower beds, and other attractions, became one of the celebrated sights of Paris. The Mabille introduced many novelties in dances, among them the cancan, brought in by Chicard. The place was closed in 1875, and its clientage was absorbed by other similar resorts.

JARGON, jär'gŏn, or **JARGOON**, jär-gōōn'. See ZIRCON.

JAR'LEY, MRS. A character in Dickens's *Old Curiosity Shop*, proprietor of a waxworks show, who befriends Little Nell.

JARNAC, zhär'nȧk'. A town in the Department of Charente, France, known as the scene of a battle fought on March 13, 1569, between 26,000 Catholics under the Duke of Anjou, afterward Henry III, and 15,000 Huguenots under Louis, Prince of Condé. The latter were completely routed, and their leader was killed. See HUGUENOTS.

JARNDYCE, järn'dīs, JOHN. A kind-hearted character in Dickens's *Bleak House*, a principal in the famous Chancery suit of Jarndyce *v.* Jarndyce.

JÄRNEFELT, yĕr'ne-fĕlt, ARMAS (1869–). A Finnish composer, born at Wiborg. At the Conservatory of Helsingfors he studied piano with Busoni and composition with Wegelius. Later he continued his studies with Massenet in Paris and Becker in Berlin. He began his career as conductor in Magdeburg, then went to Düsseldorf, and from there as principal conductor to the Royal Opera of Stockholm. In 1906 he succeeded Wegelius as director of the Conservatory in Helsingfors. Next to Sibelius (q.v.), he is the most notable among early twentieth-century Finnish composers. His works include a symphonic poem *Korsholm*, two concert overtures, a serenade, a phantasy, and suites for orchestra; choral works with orchestra; male choruses; piano pieces and songs.

JARO, HÄ'rō. A town of Leyte, Philippines, situated in the north part of the island, 15 miles west-southwest of Tacloban (Map: Philippine Islands, E 5). Pop., 1903, 11,066.

JAROCHOWSKI, yä'rō-KŌv'skē, KAZIMIR (1829–88). A Polish historian, born at Sokolniki and educated at Posen and Berlin. He took part in the Polish uprising of 1848, but in 1862 entered the Prussian magistracy and resigned in 1882. He died soon after his election to the Prussian Diet. His historical studies deal especially with Poland under the Saxon kings.

Among them the more important are: *Teka Podoskiego* (1854–61); *Wielkopolska w czasie pierwszej wojny szwedzkiej* (1864), dealing with the first Swedish war; *Dzieje panowania Augusta II* (1856–74); *Opowiadania i studia* (1860–84); *Literatura posnańska* (1880).

JAROSLAU, yä′rô-slou′. A town of Galicia, Austria, and an important garrison, on the San (an affluent of the Vistula), 130 miles east of Cracow by rail (Map: Austria, H 1). It has evangelical, Roman Catholic, and Greek churches, and is an industrial centre, with manufactures of textiles, pottery, bricks, tutty, pastry, smoked meats, and spirituous liquors. There is also a considerable trade in agricultural produce, hides, and lumber. Pop., 1900, 22,660; 1910, 23,965, mostly Poles. In the European War, which broke out in 1914, Jaroslau was captured by the Russians, but was later retaken by the Austro-German army. In the second Russian invasion of Galicia it was reoccupied after severe fighting, and the way to Przemysl (captured in March, 1915) and Cracow opened up. See War in Europe.

JAROSLAV, yȧ-rôs′lȧf. A Russian government and its capital. See Yaroslav.

JARRAH WOOD. See Eucalyptus.

JARRIC, zhȧ′rēk′, Louis Etienne, Chevalier de (1757–91). A West Indian revolutionist, born at Aux Cayes, Haiti. He had no legitimate claim to the name he bore; but his father had him well educated, and he was in France at the time of the Revolution, serving as a captain. A mulatto himself, he started a society in Paris called Friends of the Blacks, but it did not flourish; so he sailed for Haiti in 1790 with a supply of arms. These he distributed among the disaffected negroes, and he headed a band of 700, which, through a victory over the regulars, was increased to 2500; but they were defeated near the river St. Vincent, and Jarric was tortured to death.

JAR′ROW-ON-TYNE. A municipal borough and seaport in Durham, England, on the estuary of the Tyne, 6 miles east of Newcastle (Map: England, E 2). Formerly a small colliery village, it was made a municipality in 1875. Its growth was due to the establishment of large iron shipbuilding and marine-engine works, blast furnaces, iron foundries, gun, paper, and chemical factories. It makes extensive shipments of coal. On the banks of Jarrow Lake are the Tyne docks, with quays, etc., covering about 300 acres. The town maintains quays, an infectious-diseases hospital, and recreation grounds. The Venerable Bede was born in Jarrow and lived and wrote and died in the Benedictine monastery built there in 682, of which there are remains. Pop., 1901, 34,295; 1911, 33,726.

JARVES, jär′vĕs, James Jackson (1820–88). An American author and art collector, born in Boston. In 1851 he went to Europe and settled in Florence, where from 1879 until 1882 he was Vice Consul and acting Consul. He made an important collection of Venetian glass and gave it to the Metropolitan Museum in 1881. But his great collection was of early Italian paintings, and he was the only American of his day (except Thomas J. Bryan, who gave his collection to the New York Historical Society in 1867) who collected primitives. Jarves hoped that his collection might become the nucleus of an American museum for the study of Italian art, but his attempts to interest the American public were unsuccessful. He was finally compelled in 1867 to deposit a large part of his collection with the trustees of Yale College as security for a loan, and, being unable to repay it in the agreed period, the pictures became the property of the college. They form the largest and most important collection of *trecento* pictures in the United States. The balance of Jarves's collection was purchased by L. E. Holden, whose widow in 1912 lent 27 of the pictures to the Metropolitan Museum. Jarves wrote a number of books on art, among them: *Art Hints, Architecture, Sculpture, and Painting* (New York, 1855); *The Art Idea, Sculpture, Painting, and Architecture in America* (Boston, 1864); *Art Thoughts: The Experience and Observations of an American Amateur in Europe* (ib., 1869)—all of which were often reprinted and had an important influence in the right direction, though of course now entirely superseded. His most important work was *Art Studies, the "Old Masters" of Italy, Painting* (New York, 1861), dedicated to his friend Charles Eliot Norton (q.v.), with 43 copperplate illustrations from the pictures of his own collection. The same year Jarves published a *Descriptive Catalogue* of his collection, with explanatory documents. A catalogue of the paintings at New Haven, by Russell Sturgis, Jr., was published in 1868. It was critically treated by Sirén, *Burlington Magazine*, xiv–xv (1908–09), as was the Holden collection by Mrs. Berenson, *Rassegna d'Arte* (January, 1907). The *Bulletin of the Metropolitan Museum* (1911–12) discusses the Holden collection and the Jarves collection of glass.

JAR′VIS, Abraham (1739–1813). A Protestant Episcopal bishop of Connecticut. He was born at Norwalk, graduated at Yale in 1761, and was ordained in England three years afterward. He became rector of Christ Church, Middletown, in 1765, and was regarded as a Tory sympathizer because of his opposition to the independence of the American church during the Revolution. In 1797 he was chosen second Bishop of Connecticut.

JARVIS, Edward (1803–84). An American physician, born at Concord, Mass. He graduated at Harvard in 1826 and at the Harvard Medical School in 1830 and subsequently practiced as a physician successively in Concord, Mass., Louisville, Ky., and Dorchester, Mass. He interested himself in the collection of vital statistics and published reports and monographs on this subject, among which are: *Physiology and Health; Elementary Physiology; Reports on the Number and Condition of the Insane and Idiots in Massachusetts.* He was for many years after 1852 president of the American Statistical Association.

JARVIS, John Wesley (1780–1834). An American portrait painter, born in South Shields, England. He was a nephew and namesake of the famous divine, who kept him till he was five years old and then sent him to join his seafaring father in Philadelphia. As a boy, he made the acquaintance of Stuart and of the aged Matthew Pratt, who greatly encouraged his aspirations to become a painter. Leaving school, he was apprenticed to an engraver named Savage and learned to draw and engrave from an Englishman in Savage's employ, Edwin by name, with whom Jarvis moved to New York. After engraving for a while on his own account, he began to paint portraits, practicing chiefly in New York. He also visited other cities, particularly Baltimore, Charleston, and New Orleans, where he painted full-length portraits of Andrew Jackson and other military and naval heroes, earning $6000 in six months. His principal portraits—of statesmen, churchmen, and naval heroes (1812–15)—are in the City Hall, New York, and in the collection of the New York Historical Society. There are two of his portraits in the Metropolitan Museum, New York. Jarvis was a conspicuous example of the artistic temperament—convivial, improvident, witty, eccentric, vain, observant, a noted story-teller, and practical joker. His work suffered from his manner of life, not so much in lack of finish as in lack of inspiration, and this despite his brilliant talents and the fact that he worked hard to acquire technique, studied anatomy seriously, and became an enthusiast in phrenology, then a novelty. He usually got the character of sitters, but his best work is decidedly inferior to that of Sully.

JARVIS, SAMUEL FARMER (1786–1851). An American Protestant Episcopal clergyman, the son of Abraham Jarvis. He was born at Middletown, Conn., graduated at Yale in 1805, was ordained in 1810, and three years afterward became rector of St. James's, New York. After a year in the chair of biblical criticism in the General Theological Seminary, he was rector of St. Paul's, Boston (1820–26), then traveled and studied in Europe, and lived in Italy until 1835, when he was appointed professor of Oriental literature at Trinity (then Washington) College. He edited the *Gospel Advocate* in 1821–26. As historiographer of the Episcopal church in America, Jarvis wrote *A Chronological Introduction to the History of the Church* (1844). He published, besides: *The Religion of the Indian Tribes of North America* (1820); *No Union with Rome* (1843); *The Church of the Redeemed* (1850).

JASHER, jā′shẽr *or* jăsh′ẽr, BOOK OF (Heb. *sepher ha-yashar*). One of the lost books of Hebrew literature. It is quoted twice in the Old Testament (Josh. x. 13; 2 Sam. i. 18). In the first passage the reference to it is lacking in the majority of manuscripts of the Greek version, and the Syriac has *sifra de teshkeḥata*, 'book of praise songs'; while in the second the Greek has *βιβλίον τοῦ εὐθοῦς*, *biblion tou euthous*, and the Syriac *sephar ashir*, 'book of Ashir,' or 'book of songs,' Jerome translating in both instances *liber justorum*. It has been maintained by some scholars that the words attributed to Solomon in 1 Kings viii 12, 13, came from this collection. The Greek version states that they were taken from the Book of Songs. It has been conjectured that the translator was misled by a transposition of letters in his text, the Book of Jasher being originally meant. But there is no evidence of this, and the nature of the poetic fragment is such that it is more likely to have come from a book containing songs connected with the temple service. Rather may it be questioned, in view of the textual condition, whether *shir*, 'song' or 'songs,' was not the original reading in the other passages. Both have the appearance of being later interpolations, but there is no reason on this account to doubt their accuracy. As to the meaning of Jasher, many suggestions have been made, chief among them that it signifies 'upright' or 'brave,' and that it refers to Israel, which is also called Jeshurun. The command of Joshua to the sun and the moon to stand still, and the lament over Saul and Jonathan by David, breathe a spirit that accords with other specimens of early Hebrew poetry. The "lost book" naturally attracted forgers, and in the thirteenth and fourteenth centuries no less than three different works purporting to be the lost book of Jasher seem to have been produced. The most famous of these was published in Naples, 1552, and has passed through many editions. An English translation was printed in London in the year 1750, and a new translation was made by Noch (New York, 1840). The *Book of Jasher* is also the title of a ritualistic treatise by Jacob ben Meir (died 1171) and of several other works of an ethical or legal character written by Jewish scholars.

JASMIN, zhȧs′măn′, JACQUES (1799–1864). A Provençal poet, born at Agen. His real name was Jacques Boé. He was apprenticed to a hairdresser, who had been a soldier of Napoleon. At 18 Jasmin was writing verses and dressing hair. Hence his name "The Barber Poet." His four collections of *Papillotos* or *Curl-Papers* (1825, 1843, 1851, 1853) were naïve little occasional verses, revealing much native power. The *Souvenirs* (1830) are a winning mixture of humor and pathos in their tale of his early struggles for literary recognition. *The Blind Girl of Castel-Cuillé* (1835) is accessible in a good translation by Longfellow. *Françounetto* (1840), a narrative poem, is Jasmin's most sustained work and won general recognition. Jasmin was received into the Legion of Honor in 1846. In 1852 his works were crowned by the Academy. He is the poetic father of Mistral (q.v.) and the Félibres. There is an edition of his *Works*, with a French translation (1860). Consult: Rabain, *Jasmin, sa vie et ses œuvres* (Limoges, 1867); Moutrond, *Jasmin, poète d'Agen* (Lille, 1875); Sainte-Beuve, *Portraits contemporains*, vol. iii (Paris, 1881–82); Andrien, *Vie de Jasmin* (Agen, 1882); Smiles, *Barber, Poet, Philanthropist* (New York, 1892).

JASMINE, jăs′mĭn, or **JESSAMINE,** jĕs′ȧ-mĭn (OF., Fr. *jasmin*, from Ar. *yasmin*, from Pers. *yasmin*, jasmine), *Jasminum*. A genus of plants, chiefly natives of the warm parts of Asia, which belong to the family Oleaceæ, containing about 100 species of shrubs, some of them climbing and many of them having exquisitely fragrant flowers. This genus has the calyx and corolla each five or eight cleft, two stamens attached to and included within the tube of the white or yellow corolla, and a two-lobed berry, one of the lobes generally abortive. The common jasmine (*Jasminum officinale*) is a native of the south of Asia, naturalized in the south of Europe as far north as Tirol and Swit-

JASMINUM GRANDIFLORUM.

zerland. In more northern regions it is much cultivated in gardens, but does not easily endure very severe winters. It is a shrub from 6 to 10 feet high, with pinnate leaves, the terminal leaflet the largest, and very fragrant white flowers. Its slender, deep-green branches give it the appearance of an evergreen. The flowers are used for preparing oil of jasmine, a delicate perfume. It blooms from June to October and requires a light, moist soil to induce free flowering. *Jasminum grandiflorum*, Spanish or Catalonian jasmine, a native of the East Indies, has flowers still more fragrant, from which, and from those of *Jasminum sambac*, oil of jasmine is also made. *Jasminum humile*, a very common greenhouse variety, is hardy in the open air as far north as Maryland. The varieties of jasmine are propagated by seeds and layers, but the usual method is starting cuttings of the nearly ripened wood under glass.

CAPE JASMINE.

A PENDENT SPRAY OF YELLOW JASMINE.

Cape Jasmine is a name popularly applied to plants belonging to the genus *Gardenia*, not related to the true jasmines. They belong to the madder family (*Rubiaceæ*) and are tropical and subtropical shrubs. The genus was named for Dr. Garden, of Charleston, S. C., who was a correspondent of Linnæus. The best-known species is *Gardenia jasminoides*, popularly known as *Gardenia florida*, brought to England from China (not from the Cape) in 1754. A double variety is a very popular greenhouse plant and is common in the Southern States as a hardy outdoor plant. It bears a large, oblong, orange-yellow berry, which is said to be used in China as a dye.

JASMINE, or **JESSAMINE,** Carolina, or Yellow. A North American climbing plant, *Gelsemium sempervirens*, of the family Loganiaceæ, which grows in Virginia and southward upon trees and fences and bears a profusion of yellow, funnel-shaped flowers an inch in diameter, with a fragrance similar to that of the true jasmine, the odor on a damp evening or morning being almost overpowering. It has been recently used in medicine as a sedative, antispasmodic, and nervine.

JA'SON. The leader of the Argonauts (q.v.). See also Medea; Pelias.

JASON (Gk. Ἰάσων). A tyrant of Pheræ in Thessaly, the successor and the reputed son of Lycophron. He came into prominence early in the fourth century B.C. and undertook to reduce all Thessaly under his dominion. By 374 B.C. he had conquered the chief cities of Thessaly and was recognized as Tagos. He then collected a large army with the object of making himself master of all Greece, but was assassinated in the midst of his preparations (370 B.C.). Consult Kent, *History of Thessaly from the Earliest Historical Times to the Accession of Philip of Macedon* (Lancaster, Pa., 1904).

JASON. A Jewish high priest, son of Simon II, and leader of the Hellenizing party. His real name was Jesus, according to Josephus (*Ant.* xxii, 5, 1). In 174 B.C. he was appointed high priest in place of his brother by Antiochus IV. For this office he is said to have paid a large sum; but he also secured for the citizens of Jerusalem the rights and privileges of Antiochians and was allowed to build a gymnasium and an ephebeum below the acropolis, near Mount Zion. Greek games, Greek caps, and Greek customs were speedily adopted. Even the priests left the altar to take part in the games in the palæstra and artificially concealed their circumcision. Jason sent a large contribution to Tyre for the festival of Hercules. In 171 B.C. he was deposed, and Menelaus raised to the pontificate. But when Antiochus marched against Egypt, in 170 B.C., Jason seized the opportunity of reinstating himself and drove Menelaus away. The King, however, upon his return from Egypt punished the city severely for what he deemed rebellious conduct. Jason was obliged to flee, first to Egypt, then to the Lacedæmonians. Our knowledge of his career depends upon 2 Maccabees and Josephus. The accounts differ in many respects, and neither can be used without great caution. Consult: Willrich, *Juden und Griechen vor der makkabäischen Erhebung* (Göttingen, 1895); Büchler, *Tobiaden und Oniaden* (Vienna, 1899); Willrich, *Judaica* (Göttingen, 1900); Schürer, *Geschichte des jüdischen Volkes* (4th ed., Leipzig, 1901); Wellhausen, *Israelitische und jüdische Geschichte* (7th ed., Berlin, 1914).

JASON OF CYRENE, sī-rē'nē. An author whose history in five books is mentioned in 2 Macc. ii. 23. The original work is lost, and known to us only in the epitome made by the author of 2 Maccabees. (See MACCABEES, BOOKS OF THE.) There is some evidence that it was used by Gorionides. It was unquestionably written in Greek. Whether Jason was a Greek or a Hellenistic Jew is not altogether known. Büchler defends the former opinion and ascribes to him those parts of 2 Maccabees dealing with the Syrian wars under Antiochus IV, Antiochus V, and Demetrius I (qq.v.). But there is reason to believe, as Willrich has shown, that the work comprised the whole history of the Hasmonæan dynasty, and that only the part of it dealing with events that occurred between 175 and 161 B.C. was epitomized. In that case it is more natural to suppose that he was a Jew. He may, however, have had access to written sources not of Jewish origin. This would account for some facts that led Niese to ascribe to 2 Maccabees, and consequently to Jason, a higher age and a greater credibility than to 1 Maccabees. It is not likely that this view will prevail. But even if preference is given to 1 Maccabees, this may not affect Jason so much as the author of 2 Maccabees. The latter has confessedly exercised much freedom. Not only has he abridged, but also added to and probably altered Jason's work. Kosters and Kamphausen have gone so far as to declare Jason a fictitious personage behind whose name the author indulged in polemics against 1 Maccabees. There is no convincing evidence, however, of acquaintance with 1 Maccabees, and such a fiction seems to most scholars wholly improbable. If Jason's work included the whole dynasty, he must have written after 63 B.C. But this is not certain. The allusion to Esther ix. 21 in 2 Macc. xv. 36 points to a time later than 114 B.C., the anti-Hasmonæan bias to a time later than 106 B.C.; but these indications only apply to the epitomizer. The 'Ιάσων κυρήναιος discovered on a temple wall in Egypt (*Revue des Etudes Grecques*, 1894, p. 297) seems to belong to the third century B.C., but there is no evidence of any connection between this man and the author. Jason may be tentatively considered as having produced his work at Alexandria in the first half of the first century B.C., as 2 Maccabees seems to have been used already by Philo.

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JA'SONVILLE. A city in Greene Co., Ind., 25 miles south of Terre Haute, on the Chicago, Terre Haute, and Southeastern Railroad (Map: Indiana, C 6). It is in a farming and productive coal-mining region, and there are brickyards. Pop., 1910, 3295.

JAS'PER (OF. *jaspre*, *jaspe*, Fr. *jaspe*, It. *jaspide*, from Lat. *jaspis*, Gk. *ἴασπις*; probably of Semitic origin, cf. Heb. *yāshpheh*, Ar. *yasb*, *yashb*, *yasf*, jasper). A cryptocrystalline variety of quartz distinguished by its opacity, which is due to the presence of clay and other substances. Jasper was known to the ancients, by whom it was called *iaspis*, and by whom it was used for ornamental purposes, owing to the high polish which it is capable of taking. It is still used for rings and seals and to a certain extent for pillars, mantels, and table tops. The colors of the different varieties of jasper are reddish brown, dark green, grayish blue, and brownish black, according to the impurities present. When the colors appear in layers, the mineral is known as striped or ribbon jasper; the brown and yellow varieties are known as Egyptian jasper. See GEMS.

JASPER. A city and the county seat of Walker Co., Ala., 35 miles northwest of Birmingham, on the Alabama Central, the St. Louis and San Francisco, the Illinois Central, and the Northern Alabama railroads (Map: Alabama, B 2). It is the centre of a rich coal field and farming and cotton district and has large saw mills, coke ovens, and some manufactures. Pop., 1900, 1661; 1910, 2509.

JASPER, WILLIAM (c.1750–79). An American soldier, born in South Carolina. He enlisted as a sergeant in the Second South Carolina Regiment in 1775 and at Fort Moultrie, on June 28, 1776, distinguished himself by recovering, through an act of personal bravery, the American colors which had fallen outside the walls. For this Governor Rutledge offered him a commission as lieutenant, but Jasper modestly refused because of his lack of education. He was commissioned by General Moultrie, however, to scour the country and harass the British outposts, and he became the hero of numerous adventures. At last, during the assault on Savannah, Oct. 9, 1779, he fell mortally wounded, while trying to fasten his regimental colors on the parapet. Consult McCrady, *South Carolina in the Revolution* (New York, 1901), and C. C. Jones, "Sergeant William Jasper," in *Magazine of History with Notes and Queries*, vols. viii, ix (ib., 1908–09).

JASPER WARE. A form of porcelain, the invention of Josiah Wedgwood. After a long series of experiments carried on at his manufactory in Burslem, England, he succeeded in 1773 in producing a compact, hard paste, susceptible of taking a very high polish. This he used in producing articles ornamented with cameo-work reliefs, etc. Barium sulphate was employed as a fluxing agent. See POTTERY.

JAS'PILITE. A banded metamorphic sedimentary rock (q.v.), made up of alternate layers of iron-stained quartz particles (jasper) and iron oxide (hematite). The bright red of the jasper and the dark brown or black of the oxide of iron give the outcroppings of this rock a brilliant appearance. In the Lake Superior region this rock has considerable economic significance, for the reason that it has a constant geological position at the top of the ore-bearing formation. This upper contact of the formation having been one of accommodation, the jaspilite has been much plicated and fractured. It is capped by a bed of quartzite called the Goodrich quartzite.

JASSY, yäs'sē (Rum. **IASĬ,** yä'shē). The former capital of Moldavia, the northern division of Rumania, on the Bachlui, a tributary of the Pruth, a few miles from the Russian frontier, in about lat. 47° 25′ N. (Map: Balkan Peninsula, F 1). It is irregularly built over a large area. Among its numerous churches the most noteworthy are the newly restored cathedral, the fifteenth-century church of St. Nicholas, and the church of the Three Saints. There are also a number of interesting residences of the boyar families. Jassy is the seat of a Greek Orthodox metropolitan and of a Roman Catholic archbishop. The educational institutions of the city include a university, with 900 students in 1913, a theological seminary, a military school, a school of art, a school of music, and a literary and scientific society. The industries are insignificant, but the commerce is important. The exports consist chiefly of agricultural and animal products, petroleum and salt, while the chief imports are foreign manufactures and coal. Pop., in 1912, 75,882, over a third of whom were Jews. Jassy was created a town in the fourteenth century and became the residence of the Moldavian princes in 1565. A treaty of peace was concluded here between Russia and Turkey on Jan. 9, 1792, by which Russia acquired Otchakov and extended her frontiers to the Dniester. The struggle for Greek independence was inaugurated at Jassy by Alexander Ypsilanti in 1821. The seat of the Rumanian government was transferred to Bucharest in 1861.

JASTROW, yäs′trô, Ignaz (1856-). A German economist and historian, born in Nakel and educated at Breslau, Berlin, and Göttingen. He became docent at Berlin in 1885 and was Von Ranke's assistant in historical work. He edited the *Jahresberichte der Geschichtswissenschaft* (1881–94); *Sociale Praxis* (1895–97); *Das Gewerbegericht* (1896 et seq.); *Der Arbeitsmarkt* (1897 et seq.); and wrote: *Geschichte des deutschen Einheitstraumes und seiner Erfüllung* (1884; 4th ed., 1891); *Social-liberal* (1893; 2d ed., 1894); *Die Einrichtung von Arbeitsnachweisen und Arbeitsnachweisverbänden* (2d ed., 1900); *Deutsche Geschichte im Zeitalter der Hohenstaufen* (1879–1901), with George Winter; *Kaufmannsbildung und Hochschulbildung* (1907); *Bürgertum und Staatsverwaltung* (1907); *Handelshochschulen* (1909); *Gedächtnisrede auf Dunker* (1911); and many other works. In 1904 he pursued industrial investigations in the United States, and in 1905 became professor of administrative science at Berlin.

JASTROW, jăs′trô, Joseph (1863-). An American psychologist, son of Marcus Jastrow. He was born in Warsaw, Poland, but came to Philadelphia in 1866. After graduating at the University of Pennsylvania in 1882 and devoting some time to graduate study there, he was fellow in psychology at Johns Hopkins University (1885–86) and was professor of experimental and comparative psychology at the University of Wisconsin from 1888 to 1903, thereafter being known as professor of psychology. In 1893 he was head of the psychological section at the World's Columbian Exposition and in 1900 he was president of the American Psychological Association. Jastrow contributed to the *Psychological Review,* of which he was associate editor, and to other periodicals. He published: *Time Relations of Mental Phenomena* (1890); *Epitomes of Three Sciences* (1890), with others; *Fact and Fable in Psychology* (1900); *The Subconscious* (1906); *The Qualities of Men* (1910); *Character and Temperament* (1914).

JASTROW, Marcus (or Morris) (1829–1903). An American rabbi and Hebrew scholar. He was born at Rogasen, in Prussian Poland, studied at the Gymnasium there and at the universities of Berlin and Halle, and in 1857 became assistant rabbi in Warsaw. His radical politics forced him from Russia in 1861. He was rabbi in Baden until 1863, at Worms until 1866, and, then coming to America, in Philadelphia until 1892, when he was named pastor emeritus. Prominent in Jewish education and charities, he is best known for his Talmudic learning and as author of *A Dictionary of the Targumim, the Talmud Babli and Yerushalmi, and the Midrashic Literature,* in 16 parts (1904), and as editor of the department of Talmud in the *Jewish Encyclopædia.*

JASTROW, Morris, Jr. (1861-). An American Orientalist, son of Marcus Jastrow. He was born in Warsaw, Poland, came to Philadelphia in 1866, and, after graduation in 1881 at the University of Pennsylvania, studied Semitic languages and religions in Leipzig and in Paris. Returning to Philadelphia, Dr. Jastrow became professor of Semitic languages and librarian in the University of Pennsylvania. Besides papers for the *Zeitschrift für Assyriologie,* the *American Journal of Semitic Languages,* and the publications of the American Oriental Society, of which he became president in 1915, and the Society of Biblical Literature, he wrote: *The Religion of the Babylonians and Assyrians* (1898; Ger. trans., 1902; new ed., vol. i, 1905, vol. ii, 1912); *The Study of Religion* (1902); *Aspects of Religious Belief and Practice in Babylonia and Assyria* (1911); *Hebrew and Babylonian Traditions,* Haskell Lectures at Oberlin (1913; rev., 1914). He edited the Arabic text of the grammatical treatises of Abu Zakariyya Hayyug (1897); *Selected Essays of James Darmesteter* (with a memoir; translation of the essays by Mrs. Morris Jastrow, Jr., 1895); a series of *Handbooks on the History of Religion.* He contributed articles on Semitic archæology to the New International Encyclopædia, to the *Britannica,* to the *Jewish Encyclopædia,* and to *Hastings' Dictionary of the Bible* and *Hastings' Encyclopædia of Religion and Ethics.*

JÁSZBERÉNY, yäs′bĕ-rān-y′. A town of the County of Jász-Nagykun Szolnok, Hungary, on the Zagyva, 40 miles east of Budapest (Map: Austria-Hungary, F 3). It has a city hall with archives, a Franciscan cloister, and several imposing monuments, also an agricultural school. Pop., 1900, 26,791; 1910, 29,675, Magyars and mostly Roman Catholics, employed in agriculture and in trade in corn, cattle, and horses.

JATAKA, jä′tȧ-kȧ (Skt. *jātaka,* relating to birth, from *jan,* to beget). The name of a Book of Birth Stories, a Buddhist work written in the Pali language and containing 550 stories of incidents in the previous births of Sakyamuni, the Buddha, and to each of these tales is given a religious coloring at the close. This large collection forms a part of that division of Buddhist sacred canon known as the *Sutta-piṭaka,* or Basket of Discourses (see Pitaka), and it is divided into 22 books, roughly classified according to the number of short rhythmical stanzas that are introduced into each narrative regarding some episode in an anterior birth. The Jatakas are of great importance in the study of folklore. The Pali text of the stories has been edited by Fausbøll, *Jātaka, Together with its Commentary* (7 vols., London, 1879–97); the Pali introduction, sketching Buddhist life, has been translated into English by Rhys Davids (London, 1880), and a valuable translation of the whole is being made by Chalmers, Rouse, Francis, and Neil, under the editorship of Cowell, *The Jātakas, or Stories of the Buddha's Former Births* (7 vols., Cambridge, 1895–1913); Lévi, "Les Jātakas, étapes du Bouddha sur la voie des transmigrations," in the *Annales du Musée Guimet*, vol. xix (Paris, 1906); Foucher, "Les représentations de 'Jatakas' sur les bas-reliefs de Barhut," in the *Annales du Musée Guimet* (ib., 1908); Dutoit, *Jātakam, das Buch der Erzählung aus früheren Existenzen Buddhas*, translated from Pali into German (4 vols., Leipzig, 1908–12); Macdonell, *History of Sanskrit Literature* (London, 1913).

JATHRIP'PA. See MEDINA.

JÁTIVA, hä'tê-vȧ, or **XÁTIVA**, formerly SAN FELIPE DE JÁTIVA. A city in the Province of Valencia, Spain, 33 miles south of Valencia, on the railroad between that city and Madrid, in the midst of gardens, vineyards, and olive orchards (Map: Spain, E 3). It was formerly strongly fortified and is still commanded by a castle situated on the brow of a hill. It has several fine promenades, and among its prominent buildings are an old collegiate church, formerly a cathedral, a silk exchange, a theatre, and a bull ring. Its water supply, brought through an aqueduct, is excellent and is utilized in numerous fountains and several public laundries. Játiva was a flourishing town in Roman and Moorish times and famous for its linens. It is the birthplace of Roderigo Borgia (Pope Alexander VI). Pop., 1887, 14,099; 1900, 12,602; 1910, 12,737.

JATS, jạts. A people of the Punjab, numbering some 5,000,000, representing the population subjected in the fourth and fifth centuries by the Rajputs, high-caste Hindus. Together with the Rajputs they constitute a definite physical type —dolichocephalic head; straight, finely cut, leptorrhine nose; long, narrow face; well-developed forehead, regular features, tall stature, and light transparent brown skin. They are sturdy, independent farmers and herdsmen, Mohammedan in religion. Consult Sir Herbert Risley, *The People of India* (Calcutta, 1908).

JAUCOURT, zhō'kōōr', ARNAIL FRANÇOIS DE (1757–1852). A French politician, born at Tournon, of a Protestant family. He played some part in the early days of the Revolution, narrowly escaped the massacres of September, and was obliged to leave France because of his moderate views. After his final return he was elected to the Tribunate (1799), became its president (1802), and in 1803 was elected to the Senate. After the departure of Maria Louisa, Jaucourt became a member of the provisional government and at the First Restoration was made a peer, and, while Talleyrand was at Vienna, held the Foreign portfolio. For a short time after the Hundred Days Jaucourt was Minister of Marine and then became Privy Councilor. He voted for Louis Napoleon in 1851 and approved the Coup d'Etat, although he had been a member of the Upper House under Louis Philippe. He was descended from Duplessis Mornay and took much interest in the welfare of Protestant France.

JAUER, you'ẽr. An old town in the Prussian Province of Silesia, on the Neisse, 38 miles west of Breslau (Map: Prussia, G 3). It has ancient churches, the palace of the former princes of Jauer, a school of commerce, and a Gymnasium. The chief manufactures of the town are machinery, leather, carpets, pens, cloth, cigars, wagons, and gloves. Jauer has a large trade in grain and a reputation for sausages. It was the capital of the Principality of Jauer, which was founded in 1303 and annexed at first to Bohemia (1392) and later to Prussia. Pop., 1900, 13,024; 1910, 13,549, mostly Roman Catholics.

JAUN'DICE (ME. *jaundys*, *jaunes*, from OF. *jaunisse*, *jaulnisse*, Fr. *jaunisse*, yellowness, from OF. *jaune*, *jaulne*, yellow, from Lat. *galbinus*, from *galbus*, yellow), or ICTERUS. The yellow color of the skin, conjunctiva, etc., arising from the presence in the blood and tissues of the coloring matter of the bile. Jaundice is a symptom of disease, not a disease itself. The fæces, from the absence of bile, are of a clay color or light-gray tint; the urine is deep saffron color, and all the other secretions are tinted with bile. The tissues are also stained, as shown at autopsies, the cut surface of the kidneys being especially yellow. The coloring matter of the bile comes from the hæmoglobin of the blood, which is transformed into bilirubin. The transformation takes place in the hepatic cells.

Icterus is due to one of two causes: (1) mechanical obstruction of the flow of bile into the duodenum (see LIVER, DISEASES OF), or *stasis icterus;* and (2) functional alteration of the hepatic cell, resulting in the production of pigmentary polycholia. *Stasis icterus* results from pressure on the gall duct or common bile duct of a tumor or new growth, such as cancer of stomach, of duodenum, of liver, or of pancreas; or fæces in the intestine; or blocking of the gall duct by a gallstone, or blocking of the common bile duct by swelling of the mucous lining and an accumulation of mucus. A gallstone or biliary calculus (see CALCULUS) causes exquisite pain when lodged in or passing through the gall duct. After the endobiliary tension has reached a certain limit the lymphatics begin to absorb the bile and carry it to the thoracic duct, which in turn empties it into the veins. The reabsorption of the bile depends on the bile pressure's being relatively greater than the blood pressure in the portal vein. Jaundice therefore occurs in the newborn babe, in some cases, because ligature of the umbilical cord prevents the blood from flowing from the umbilical to the portal vein. The jaundice of fasting is accounted for by the diminution of pressure in the portal system, owing to insufficient intestinal absorption. Functional alteration of the hepatic cell occurs in phosphorus poisoning and in grave infective conditions, such as yellow fever. In yellow fever there is enormous destruction of the red cells of the blood, but there is also altered biliary function of the liver cells, with a consequent inspissation of the bile. Semmola and Gioffredi classify icterus, according to clinical types, into primary or secondary forms, as follows, without regard to our pathological knowledge of the subject:

Primary	1. Catarrhal (acute or chronic). 2. Febrile. 3. Grave (acute yellow atrophy). 4. Emotional. 5. Of the newborn.
Secondary	1. To infections. 2. To hepatic disease. 3. To intrinsic or extrinsic stenosis of the bile ducts.

Two types of jaundice deserve special mention. *Icterus neonatorum* (jaundice of the newborn) results physiologically from the destruction of large numbers of red blood cells during the first few days of life or from interruption of the placental circulation, permitting absorption from the bile capillaries. Pathologically it may arise from septic poisoning through an infected umbilical stump, from syphilis, or rarely from congenital absence of biliary passages. Usually the condition is evanescent and requires no treatment beyond mild purgation.

Weil's Disease (acute febrile jaundice) is most common in the summer and occurs chiefly among laborers, brewers, and butchers. Cold is an exciting cause, but the active agent is believed to be one or more microörganisms. The disease comes on suddenly, with a chill, followed by fever, headache, nausea, and epigastric pain. The liver and spleen are enlarged and tender. The treatment is the same as that for ordinary jaundice, and recovery is the rule. See Children, Diseases of.

During the existence of jaundice changes in the diet should be made, fats being avoided and constipation relieved. Mercury, chloride of ammonium, phosphate of sodium, and hyposulphites are useful drugs.

JAUNPUR, joun-pōōr′. The headquarters of a district of the same name in the United Provinces, British India (Map: India, E 4). It is on the river Gumti, 34 miles northwest of Benares. It has manufactures of perfumes and papier-mâché and a fair trade, but its chief interest is archæological. It was in ancient times the capital of a Mohammedan kingdom. Sultan Feroz III, of Delhi, having ordered a Hindu temple to be demolished, erected in 1370, around its ruins, a fort of solid stone. He sent numerous artificers and others to inhabit the new city, which was completed in 12 years. Pop., 1901, 42,771; 1911, 30,473.

JAUNTING CAR, or Jaunty Car. A two-wheeled carriage, very common in Ireland. The seats are extended back to back over low wheels, and at right angles to the wheels, the passengers riding sidewise.

JAURÉGUIBERRY, zhō′rā′gē′bĕ′rē′, Jean Bernard (1815–87). A French naval officer. Born at Bayonne, he entered the navy in 1831, was made lieutenant in 1845, commander in 1856, captain in 1860, rear admiral in 1869, and vice admiral in 1870. He served in the Crimean War, in active operations in China, and as Governor of Senegal (1869). Finding no opportunity for service afloat in the Franco-Prussian War, he applied for a command in the army, and his request was granted. He was in command of a division at Coulmiers, Villepion, and Loigny-Poupry, while in the retreat upon Le Mans and in the battle at that place he commanded a corps. In 1871 he became commander in chief of the Toulon fleet and in 1876 was given the command of the Mediterranean evolutionary squadron. He served in many other important naval capacities, including Minister of Marine (1879–80, 1882–83), and in May, 1879, he was elected a senator for life.

JÁUREGUI Y AGUILAR, hou′rā-gē ē ā′gē-lär′, Juan Martínez de (1583–1641). A Spanish poet, born at Seville. He seems to have begun his career as a painter and to have gone to Rome to study art. Some have identified him with the Jáuregui who painted a picture of Cervantes, and whom the latter mentions in the prologue to his *Novelas*. (A portrait, recently discovered and now in the possession of the Real Academia Española, and purporting to be of Cervantes and by Jáuregui, is considered by many critics to be authentic and the very portrait mentioned by Cervantes. See the reproduction thereof in the article Cervantes Saavedra, Miguel de.) While in Italy he studied Italian literature, and by the publication at Rome, in 1607, of his verse translation of Tasso's *Aminta*, he firmly established his literary reputation. He seems to have returned to Spain late in 1609. In 1618 he published an edition of his verse (*Rimas de Juan de Jáuregui*) at Seville. In the preface to this volume he protested against the baneful mannerisms that Góngora had introduced into Spanish poetry, and his *Discurso poético contra el hablar culto y oscuro* (1624; cf. the reprint of this in Menéndez y Pelayo's *Historia de las ideas estéticas en España*, Madrid, 1884–89) contains so skillful an attack on these same mannerisms that it won him knighthood in the Order of Calatrava. Yet his own *Orfeo*, a poem in five cantos on the well-known classic legend, has some of the stylistic aberrations of Gongorism, and it was published at Madrid the same year. Jáuregui yields entirely to the Gongoristic current in the *Farsalia* (a version of Lucan's Latin poem), published posthumously in 1684. His permanent title to fame must rest upon the translation of the *Aminta* and on one or two of the lyrics contained in the *Rimas*, especially the graceful *silva* on his lady-love bathing. Consult the edition of the *Aminta* in López de Sedano, *Parnaso español*, vol. i (Madrid, 1768–78), and the edition of Jáuregui's poems in *Biblioteca de autores españoles*, in vol. xlii (ib., 1857).

JAURÈS, zhō′rĕs′, Jean Léon (1859–1914). A distinguished French Socialist and writer, born at Castres (Tarn) of well-to-do middle-class parents. He was given an excellent education at the Lycée Louis le Grand and at the Ecole Normale Supérieure. For some years he was a professor of philosophy at the University of Toulouse. In 1885 he was elected to the Chamber of Deputies as a radical Republican, but was defeated four years later by a Monarchist. In 1893 he was returned as a Socialist Deputy, and his great oratorical powers quickly made him one of the leading figures in the Chamber. From that time on he was almost continuously in public life and was regarded as the leading Socialist of France, sharing with August Bebel (q.v.) the leadership of international Socialism. The moderation of Jaurès's Socialism brought upon him the bitter hostility of the revolutionary Marxians led by Jules Guesde (q.v.). The Marxians saw in the Dreyfus affair merely a "bourgeois quarrel" which was of no concern to the worker. To Jaurès it was a great human issue which involved not only the fate of an innocent man but that of the Republic as well. He threw himself into the fray with all his ardor and became one of the stoutest defenders of Captain Dreyfus. When the radical Republican *bloc* was formed in 1899 under Waldeck-Rousseau, he consented to the inclusion of the Socialist Deputy Millerand (q.v.) as a member of the cabinet. Jaurès's support of the *bloc* was the decisive element in the struggle which followed to disestablish the church and to republicanize the army. The followers of Guesde, having denounced Jaurès as a traitor to Socialist ideals for having compromised with the "bourgeois state," saw to it that the matter was taken up by the International Socialist Congress which met at Amsterdam in 1904. A resolution that no bona fide Socialist should be allowed to hold office in a bourgeois cabinet gave rise to a great debate in which Bebel and Jaurès took the leading parts. In spite of the latter's eloquence the resolution passed the congress, and all Socialist factions in France were ordered to unite. Jaurès, accepting his defeat with good grace, became the leader of a unified Socialist party, which in the election of 1914 returned more than 90 deputies.

Jaurès, although opposed to the main theories of Syndicalism, nevertheless warmly championed the cause of the workers in the great railway strike of 1910. He strongly denounced the Briand ministry for having resorted to mobilization orders to break the general strike. Jaurès favored an agreement with Germany which would do away with militarism by calling a halt on further armament. Socialists, he held, should urge all possible methods of arbitration, but if these failed they should fight willingly the *aggressor*. He even favored a general strike to stop war, but on condition that it be under *international* direction and not confined to one country. He was the chief opponent of the three years' military law passed by the Chamber in 1913. Just before the Great European War broke out, in 1914 (see War in Europe), a meeting of Socialists took place in Brussels, at which Jaurès made a notable attack on militarism. His speech aroused great antagonism, and it was only a few weeks later (July 31) that a semidemented youth, incited by recent attacks on the Socialist leader, assassinated him in front of a café in Paris.

Jaurès was a voluminous writer. For the *Histoire socialiste* (12 vols., 1901–08), to which he was the chief contributor, he wrote vol. i, *La constituante* (1901), vol. ii, *La législative* (1902), vols. iii and iv, *La convention* (1903), vol. x, *Le second empire* (1907), and part of vol. xi, *La guerre franco-allemande* (1908). He also published *Discours parlementaires* (1904); *Etudes socialistes* (1902), translated by Mildred Minturn (1906); and *L'Armée nouvelle* (1911). Jaurès was editor of the Parisian journal *L'Humanité*, which he founded in 1904 and to which he contributed regularly. For description of the personality and ideas of Jaurès, consult S. P. Orth, *Socialism and Democracy in Europe* (New York, 1913); J. S. Schapiro, "The Drift in French Politics," in the *American Political Science Review* (Baltimore, 1913); and the anonymous article in *Current Literature*, February, 1914 (New York). See Socialism.

JAVA, jä'vȧ (commonly derived from Skt. *yăva*, rich in millet, from *yava*, millet; but it is worthy of note that *Java*, or in the more ancient form *Java-dvipa*, is associable with the proto-Polynesian *Sava* or *Hava*, which, in composition with *Iki*, appears in Polynesian in such widely different names of major geography as Havaiki, Hawaii, Savaii). The most important island of the Dutch East Indies, lying south of the equator, between the parallels of 5° 52′ and 8° 59′ and between the meridians of 105° 13′ and 114° 39′ E. (Map: East India Islands, C and D 7). It is bounded on the north by the clear, shallow waters of the Java Sea; on the south by the Indian Ocean; on the west by the Strait of Sunda, which separates it from Sumatra (also a Dutch possession); and on the east by the Strait of Bali (11 miles wide), separating it from the island of Bali. The south coast is steep and precipitous, with cliffs rising almost perpendicularly to a considerable height, and is bordered by a long line of breakers. The north coast is low and swampy in many places and overgrown with mangrove trees and bushes, particularly towards the west. The island is long and narrow, its greatest length, from west-northwest to east-southeast, being 666 miles, and its breadth from 46 to 121 miles. Area, 48,503 square miles. With Madura and several smaller adjacent islands administratively belonging to it, it is known officially as "Java and Madura." The area of the whole is 50,554 square miles. Java is one of the richest and most populous islands in the world. It is unsurpassed in fertility and in the beauty of its scenery. It has passed through many historical changes and is intensely interesting archæologically.

Topography. Java is very mountainous and is remarkable for the number of its volcanic peaks, 45 in all—ranging in height from 2000 to 12,040 feet above the level of the sea, clad with verdure to their summits and having slopes fertile in nearly all their climatic zones. The general trend is from west to east. A striking difference is noted between the western and eastern halves of the island. In the former the volcanoes are bunched together, forming great masses, without intervals or plateaus. Towards the east the volcanic peaks are for the most part isolated one from the other, with a large number of valleys and plains, deep gorges and rushing streams. Most of the active volcanoes are found in the western end, and of these 14 are found in an area of 20 by 35 miles. During historic ages these volcanoes are known to have destroyed many tens of thousands of human lives, and within recent times several have exploded, spreading devastation on all sides. The peak of Ringghit, once one of the highest, lost much of its form by internal explosions in 1686, destroying, it is estimated, approximately 10,000 lives. In May, 1901, the Kloet, one of the smaller volcanoes, broke into eruption after many years' quiet, enveloping towns 150 to 250 miles distant in thick darkness, destroying the sugar crop and killing several Europeans and about 100 natives. Among the best-known mountains are: Salak, 7000 feet, south of Batavia; Gêde, 9718; Tjirmaj, 10,070; Slamat, 11,247; Marbabu, 10,673; Raun, 10,822; and Semeru, 12,040 feet high. The list of eruptions in historic times is a formidable one, that best known in the Western world being that of Krakatoa (q.v.) in the Strait of Sunda. Earthquakes are of common occurrence, though not usually very destructive.

Java abounds in plains, valleys, and forests, the richest alluvial coast land being in the northwest, in the provinces of Bantam, Batavia, Krawang, and Cheribon; yet all through the eastern half are many beautiful and fertile plains, and no part of the island, unless it be the Preanger Residency, which occupies the south half of the western part, and a few provinces in the east half, lacks rivers. As the south coast is relatively high and mountainous, with a long north slope, most of the streams flow into the Java Sea. In the rainy season at least 50 streams can be used for floating rafts to the sea, and five or six are always navigable for some distance from their mouth. The longest is the Solo, about 300 miles long, on which is situated the city of Surakarta. For most of the year it is navigable for boats and river steamers. The Surabaya River, or Brantes, the next in importance, rising on the west slope of Semeru, forms, with its tributary, a curve with three sides and enters the sea near the Solo, one of its mouths being near the city of Surabaya, where is found the best harbor in Java. The third important river is the Tji Manuk, which nearly traverses the island, and the fourth is the Tji Tarun.

Climate. Though so near the equator, Java is, to those who avoid excess in eating and drinking and avoid exposure to the insect life of the lowland marshes, quite healthful. From April to October there is perpetual sunshine, with only occasional light showers, and the Western white man must avoid the direct rays of the sun during the heat of the day. From October to April there is almost a steady rainfall, except that the sun shines for a while daily, generally during the morning. In the west, however, no part of the year is free from rain. Land and sea breezes render life comfortable all the year round. Violent storms, winds, or hurricanes are unknown, though near the high peaks rains, with terrific lightning and thunder, are frequent. The annual rainfall is about 80 inches, the heaviest rainfall occurring in December, January, and February. The average temperature at Batavia is 78.69° F. (the average of 12 years), and the extreme range on the lowest levels is 26 degrees.

Flora. Java has many botanical zones. The deep black soil produces a richness and an abundance of products in the vegetable kingdom that is without parallel in any other part of the world within an area so limited. Almost all the plants are evergreen, and most of the villages are concealed by the perpetual verdure. The lowest zone, from sea level to 2000 feet, has the most extensive area. Here the heat is tropical, and here we find rice, sugar, cotton, indigo, mangoes, and palm trees. The swamps and plains are covered by cultivated areas, thickets of bamboo, patches of tall grass, and a profusion of flowers. The second level, which extends from 2000 to 4500 feet (the heat is moderate), produces coffee, tea, cinchona, dozens of varieties of palms, fruits, vegetables, teak, mahogany, sandalwood, rubber and camphor trees, rattan, bamboo, many fancy and rare woods, and thousands of vines and flowering shrubs. The third zone, from 4500 to 7500 feet, is moderately cool, and produces maize, tobacco, cabbages, potatoes, etc.; and in the fourth zone (7500 to 12,000 feet) the flora exhibits many genera found in temperate Europe. The fruits are abundant and include oranges, limes, pomelos, the coconut, banana, mango, mangosteen, the duku, the rambutan, and the durian. In the gardens near their houses the natives cultivate fragrant and ornamental flowers. About one-fourth of the area of Java is reckoned as forest, and only in comparatively recent years has this source of wealth been taken advantage of. Teak is the chief wood exported.

Fauna. Fifty species of mammalia are found in Java. Of the larger animals the tiger, leopard, rhinoceros, wild sheep and deer, two species of wild boar, the jackal, wild cat, and many species of monkey are found in the forests. Bats are plentiful, the kalong or "flying fox," a fruit-eating bat, doing much damage to sugar palms, maize, and young coconut trees. The buffalo, next to the native pony, is the most valuable animal, being used both for draft and for food. Domestic animals, such as sheep, goats, cows, and swine, though below the ordinary size, are not scarce. Horses from Arabia and pigs from China have been introduced and thrive. The smaller game in forest and marsh is numerous. In the watercourses are the crocodiles, from 20 to 30 feet in length, and always ravenous and dangerous. Large troops of wild dogs are found in the jungles. Among birds, the peafowl and pelican are the largest, the former being found in flocks. There are nearly 300 species of land birds, including jungle fowl, various species of woodpeckers and kingfishers, the hornbill, the black and crimson oriole, the minaret flycatcher, the yellow and yellow-green trogon, etc., and the swift (*Collocalia fuciphaga*), which inhabits deep caverns near the sea and cliffs and furnishes the edible birds' nests (see SALANGANE) so much prized by the Chinese for soup. Land and water turtles abound. The varieties of snakes are almost countless. The python is quite common. The insects are without number, but not many of them overtroublesome or venomous. Many rare and beautiful butterflies are found, including the calliper butterfly. The sea abounds in fish, and 600 species are known, besides 34 species of river fish.

Geology and Mineral Resources. Java has been for so many ages under a stress of volcanic action that the strata anciently deposited have been again and again disturbed; yet it appears that the underlying rocks are for the most part granite and syenite, and on these rest sedimentary rocks of the Tertiary period. Though the absence of the fossils of vertebrates is noticeable, the rocks containing the invertebrates are very abundant; but the volcanic deposits have covered up or distorted the older formations in every part of the island. Coal is found in many places, but in thin strata. The best mineral fuel, lignite, is found in Bantam. Asphalt, clay (excellent for bricks and earthenware), limestone, marble, manganese, sulphur, salt, and saltpetre are obtained. The production of petroleum has become important, the quantity produced in 1911 being 425,000,000 gallons. Java is the poorest of the East Indian islands in minerals.

Agriculture. The great majority of the natives are farmers or agricultural laborers. Rice is the chief article of food, and its production the chief industry. By gift from the last Mohammedan Emperor, who abdicated in 1749 in favor of the Dutch, and by purchase from the native princes since then, the Dutch government now owns almost all the land. Along with the Mohammedan gift they secured the right to receive one-fifth of the produce and of the labor of the peasant. This made easy the introduction in 1832 of the "culture system," which has since prevailed. This consists in obligatory service on the part of the peasant, under official superintendence, in the cultivation of tobacco, coffee, sugar, indigo, tea, pepper, etc. Now coffee only is produced by enforced labor. About 8,638,600 acres are under native cultivation. The lands now the property of Europeans cover 1,969,544 acres; of Chinese, 316,209 acres; and of other foreign Orientals, 22,923 acres, and in addition to this there were leases of over 1,000,000 acres to Europeans. The chief products are as follows: sugar (1912), 1,443,584 tons (including the whole of

Dutch India, mostly, however, grown in Java); coffee, including Sumatra (1912), 34,280 tons; cinchona (1911), 21,412,417 pounds; tobacco, including Sumatra (1911), 189,771,968 pounds; tea (1911), 55,697,639 pounds; indigo (1912), 175,504 pounds; cocoa (1911), 3,912,328 pounds; and pepper (1912) 24,071 tons. The tin mines of Banca and Billiton yielded, in 1913, 15,346 tons; the coal mines of Java, Sumatra, and Borneo, 411,000 tons. Java holds third rank among the cane-sugar producers of the world, and second as an exporter of that product. The production of 1912–13 was 1,458,000 tons against 2,492,000 in Cuba and 2,552,000 in India, which latter country, however, produces practically none for the export trade.

Communication. Java is well supplied with good roads. Railway construction began in 1875, and now railways extend across and from end to end of the island. The total length of the railways, state and private, in 1911 was 1393 miles, and of telegraph lines, 10,000 miles. Batavia, Samarang, and Surabaya have been connected by telephone since 1896. The gross receipts of the railways in 1911 were 29,722,000 guilders; passengers carried, 36,867,000.

Commerce. In 1911 the total value of the imports of Java was 373,289,000 guilders (guilder = 40.2 cents); of the exports, 510,612,000 guilders. The chief imports are piece goods, fertilizers, and coal from Wales, Australia, and Japan. Much petroleum from Sumatra and tin from Banca are entered for reëxport. The chief exports are sugar, coffee, tobacco, rice, cinchona bark, quinine, which goes mostly to the United States and London, tea (almost entirely to Holland), copra, indigo, kapok (mostly to Australia), hides, timber, rubber, gutta percha, cocoa, tapioca, and spices. With the exception of rice, about one-half of which goes to Borneo and China, nearly four-fifths of the exports go to the Netherlands. There is considerable trade with Penang and Singapore. The only legal coins are those of Holland.

Intercourse with the Outer World. Intercourse with Java, and indeed with the Dutch East Indies generally, is hedged about with many irksome restrictions and regulations. One may land at any of the ports, but cannot stay on shore for more than 24 hours without registering, giving name, age, religion, nationality, place of birth, occupation, name of the ship on which one arrived, the captain's name, etc., and receiving a permit. If travel in the interior is desired, another permit is necessary; sureties have to be provided, the intended route indicated, fees have to be paid, and time is consumed, as every step is taken with true Dutch deliberateness. This pass is not good for more than six months. Should one wish to enjoy sport, however, still another document is needed, entitling the holder to import his gun and ammunition, and more fees, chiefly stamp dues, are demanded. Should one wish to settle in the country, the conditions are still more formidable, the time consumed much greater, and the fees quite considerable. Two sureties, each in a large sum, are needed, and the strictest inquiries are made, and should any inadvertence occur, or any slight discrepancy be found in the initials, the spelling of the name, or the like, it may vitiate the whole proceeding and lead to the rejection of the application; and lastly, when one wishes to leave the island, still another permit is necessary, and it cannot be obtained in a hurry, as wide inquiries have to be made as to whether all one's debts have been paid, and the like.

Government. "Java and Madura," with the surrounding islets included in the same administration, is divided into 17 residencies, under the control of a Governor-General, who has great executive and even a certain amount of legislative power. He is assisted by a council of five, whose functions are legislative and advisory. In each province there is also a resident, assisted by assistant residents and subordinate officers called controllers. Nevertheless the administration, so far as the Javanese see it, is carried on through a network of native officials, to whom the foreign rulers are "elder brothers." There is daily conference between the Dutch and native chiefs, and in all matters between them the Javanese language is used, Dutch not being allowed to be spoken. Each resident exercises judicial, financial, and administrative functions, dealing with civil and criminal cases. To each assistant resident there is an *afdeeling*, or department. The controller is really the link between the natives and foreign officers. He makes a personal inspection of his district every month, having supervision of everything—observing, advising, and reporting—but with little executive authority. Out of the ancient noble families a native regent is appointed, whose rank and right of precedence are superior even to those of all other European officers except the resident. He is the head of the native officials in his province and receives a salary of 2000 to 3000 florins; but in one or two cases—e.g., the Sultan of Jokja Karta and the Regent of Bandong—the allowance is 84,000 florins. The residents number 17, the assistant residents about three times as many, and the controllers a slightly larger number. The residents and controllers are appointed only after a searching examination in the Javanese language, customs, and conditions. The Governor-General resides in Batavia, the capital. In the administration of justice there is a distinction made between Europeans and natives and Orientals. The former are subject to laws based on those of the Netherlands, while in the regulation and trial of the Javanese and those classed with them, their own traditions, customs, and law, under the direction of the native chiefs, decide questions of equity and law. The High Court of Justice is at Batavia, with lower courts in the five large cities, besides a number of circuit, district, and in some places priestly, courts. For the defense of the colony there is an army of about 35,000 (about two-thirds being natives), with headquarters at Batavia, and a navy, with headquarters at Surabaya. The expenditure for defense was in 1914 about $19,000,000, of which about one-fourth was disbursed in Netherlands.

Finance. The revenue is derived from land and the usual taxes, licenses, customs dues, the government monopolies of salt, opium, and railways; but the largest item is from the sale of coffee grown under the "culture system" and sold by the government, as well as the sale of quinine and tin. The budget of Java forms a part of that for the Dutch East Indies. The local revenue is derived from land taxes and licenses, customs duties and certain indirect taxes. The revenue of 1914 was 256,957,000 guilders, and the expenditures 335,050,000 guilders.

Population. In 1800 Java, according to a rude census, had 3,000,000, and, in 1813, 6,000,000 inhabitants. In 1896 Java and Madura had 26,125,053 inhabitants, including 51,737 Europeans, 261,080 Chinese, 17,045 Arabs, 3238 other non-indigenous Orientals, and 25,791,953 natives. In 1900 Java and Madura had 28,746,688 inhabitants. In 1905 the population was estimated at 30,098,000, including 75,833 Europeans and Eurasians, 537,316 Chinese, and 27,400 Arabs.

Ethnology. The native inhabitants of Java belong to the Malay race, the alleged Negrito peoples of the interior having no real existence. The Javanese proper dwell in the central portions of the island and towards the east, the Sundanese in the west, and the Madurese in the east and on the adjacent islands of Madura, Bavian, etc. In the mountains of Bantam, in the extreme west, live the Baduwis, and in the mountains of the extreme east the Tenggerese, both of whom are very primitive peoples of the sort sometimes styled Indonesian, or proto-Malay, who, in spite of the influence of their Islamic neighbors, have preserved much of their old "heathen" religion. The much-discussed Kalangs, if at all a separate people, which is improbable, are on present evidence part of the aboriginal Malayan or proto-Malayan stock. Slavery and colonization have added at various periods minor elements to the Javanese population. Thus, there still exists in Batavia a "Bali village," testifying to the fact of deportation from that adjacent island in times past. The Baduwis and Tenggerese are less brachycephalic than the Javanese proper, the Sundanese, and the Madurese, and they are probably of somewhat greater average height, with a rather lighter skin. Outside of the "heathen" tribes of the interior, the Madurese seem to have accepted least the conditions of civilization. The Javanese proper are yielding somewhat to the Madurese on the east, but the Sundanese in the west seem to be becoming more Javanized, and the Javanese may still be looked upon as the average of the island population. The three principal peoples of Java have each their own language, a Malayan dialect with more or less individuality. The marked aristocratic tendencies of the Javanese, which find expression in social and governmental institutions, are reflected also in their language, with its "noble" and "common" forms of speech. The old Javanese of the monuments, inscriptions, etc.—the ancient literary language—is called Kavi (q.v.). Sundanese, though not at all neglected, has received less attention. The puppet plays, or *Wajang*, of Java, to which some authorities have too hastily attributed an entirely Indian origin, and the mask plays, or *topeng*, of which both popular and classical varieties exist, have been recently much studied. The *babads*, or chronicles, are another feature of Javanese folk literature. The Javanese represent perhaps the highest point of Malay culture, and show at the same time its limitations when controlled by Europeans. Not all of Javanese culture was created or suggested by India, probably less than is generally believed. Hindu influence in Java began before the beginning of the fifth century A.D. and had its greatest effects upon the religion, political divisions, language, and literature of the island. The advent of the religion of Islam in the fifteenth century was at first much more rapid and revolutionary in its effects. To-day the great majority of the nearly 30,000,000 Malays of Java are professors in some way or other of Islam, their creed being mixed here with relics of primitive Shamanism and there with echoes of Hinduism, Buddhism, etc. Besides the loan words in the language, the alphabet in which it is written, and the general influence upon arts of all kinds, Hindu contact has its monument in the great temples to Buddha erected in Java (700–1450 A.D.). One of these, the Great Buddha, or Boro Buddor (q.v.), is by some esteemed the greatest example of Buddhistic architecture in existence. The foundation, under Hindu influence, of kingdoms such as those of Madjapahit, led to the extension of Javanese culture into Sumatra, Borneo, and several of the smaller islands of the Malaysian Archipelago, and some have traced it even to Papua and Australia. The great numbers of the Javanese Malays, and the fact that they are not at all moribund, but a rapidly increasing people, make them one of the most important groups of mankind for the historian of human culture. The discovery by Dr. Eugene Dubois (1891–94) of the upper part of a skull, two molars, and a femur, in what is said to be a Pleistocene deposit at Trinil, on the river Bengáwan, has given rise to a voluminous literature of study and discussion. See MAN, SCIENCE OF, *Ancient Types*.

Education. Separate school organizations are maintained for natives and Europeans and those assimilated with them. In 1911 there were 706 primary schools for the natives maintained by the state and 507 private schools; the pupils in the two classes were 145,709 and 52,551 respectively. Besides these, there are several middle schools, and normal schools for training native teachers. For the Europeans there were a number of separate schools, both public and private (including several for girls only), besides normal schools at Batavia and Surabaya. There is a gymnasium at Batavia, and there are an agricultural college, a museum, and a botanical garden (one of the finest in the world) at Buitenzorg, the residence of the Governor-General, on the slope of Mount Salak near Batavia.

Religion. Perfect liberty is allowed to all forms of faith. Buddhism was early introduced; but by 414, when Fa Hein, the Chinese Buddhist, visited Java, he wrote that little Buddhism could be found. This was succeeded by Brahmanism, which continued until the Mohammedan conquest in 1475–79 and now lingers only in Bali. Nominally the Javanese are now Mohammedans, and great respect is paid to a returned pilgrim from Mecca, nearly 10,000 pilgrims leaving Java under this pretext of holy visitation annually. The mass of the natives, however, follow the primitive animism of their ancestors and are very religious, in the sense of being under the influence of unseen and mysterious spirits of local importance. About 150 Christian missionaries of various societies, chiefly Netherlandish, labor among them, about 400,000 natives being enrolled in the Roman or Reformed churches.

History. The history of Java, shorn of legend, fable, and mythology, is very simple. Civilization came to the aborigines from India, Buddhism at first being paramount. The Sivaism of the Hindus followed and prevailed for centuries, during which time many Hindu states were set up, that of Madjapahit being chief, with vast power and influence. The struggle between the two faiths introduced from India culminated in a compromise, which is very marked and easily discernible in their art, antiquities, and ruins, of which the great mass called Boro Buddor (q.v.) furnishes a conspicuous example, superb copies of the sculptures from which were exhibited at the Paris Exposition of 1900. The chief towns containing Hindu remains are Surabaya, Samarang, Solo, Jokjakarta, and Magalang, in the centre and east of the island. The third great epoch was introduced by contact with the Europeans, when the Dutch navigators and their East India Company had trading stations along the coast. The Portuguese made their way to Java early in the sixteenth century, but about the close of the century they were supplanted by the Dutch. The paramount native state at this time was Mataram, and in the early Dutch records its princes are called emperors. The gradual extension of Dutch rule was effected in much the same manner as that of the conquest of India by the British. Their authority was extended over the Preanger Residency in 1705, over the whole northwest coast in 1745, over Surakarta and Jokjakarta by 1755, Bantam coming under their control in 1808. The British held the island from 1811 to 1816, still further asserting and extending European control, and introducing great reforms in the administration under the vigorous government of Sir Stamford Raffles; but on regaining the island the Dutch pressed their claims with increased vigor. Their chief idea seemed to be to use Java simply as an appendage to the Netherlands, to secure revenue and pay off the debts of the "mother country"; but since 1870 the general policy has been to hold the colonies for at least mutual benefit, with increasing purpose to benefit the Javanese in every way as far as possible. The three European names most closely associated with the development of Java are Daendels, Raffles, and Van den Bosch (q.v.). When in 1825 the native chief, Dipa Negara, struggled to regain ascendancy, a war broke out which lasted five years and ended in undisputed control by the Dutch.

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JAVA FOWL. An old-fashioned breed of domestic fowls, white, black, or mottled, with a small, single, upright comb in both cocks and hens. The shanks and toes are yellow and free from feathers. The cocks weigh from 9 to 10 pounds, and the hens about 7½ pounds. They are good, useful fowls and easily kept.

JAV'ANESE LANGUAGE. A language of the Malayo-Polynesian group, which is the vernacular of Java. Largely through Indian influence Javanese became the medium of an important literature as early as the ninth century A.D. In this ancient form Javanese was modified in its vocabulary to a large extent by Sanskrit, and it was accordingly termed Kavi (q.v.) as being preëminently the language of poetry. The direct derivative of Kavi is modern Javanese, which is divided into the courtly or Krama and into the vernacular or Ngoko. Ngoko is used in speaking to an inferior, while Krama is used in addressing a person of superior social station. These two forms of speech differ rather in vocabulary than in morphology. A third language, called Madhya or middle, partakes of the characteristics of both the others, although more closely resembling on the whole the Ngoko. The Javanese are thus bilinguists or even trilinguists, the use of one language in preference to the other being dictated by certain rules of social etiquette. This phenomenon may have its origin in word taboo. Javanese literature consists in great part of translations from the Kavi, and thus ultimately from the Sanskrit. Here belong such works as the *Brata-yuda*, the *Arjuna-sahasrabahu*, and the *Arjuna-vivahana*, all based on the Mahabharata (q.v.), as well as the *Rama*, derived from the Ramayana (q.v.). The *Manik-Maya* is important as a source of Javanese cosmogony and mythology, and the *Babads*, or prose chronicles, are of interest both linguistically and historically. Akin to the Babads are a number of historical romances, such as the Damar Wulan and the Raja Pirangon. In drama Javanese is rich in shadow plays (*wayang*), mainly based on old legends, and the beast fable is highly developed. There are also translations and imitations of Arabic religious literature.

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JAVARY, zhä′vȧ-rē′. A right tributary of the upper Amazon. It rises at the extreme western angle of the boundary of Brazil with Peru and flows north and northeast through the immense and unexplored forests of La Montaña, joining the Amazon in long. 70° W. (Map: Brazil, C 5). It forms nearly half the boundary line between Brazil and Peru and is navigable nearly to its source, a distance of over 300 miles.

JAVA SPARROW. A well-known cage bird (*Munia oryzivora*), known in the East as rice-bird, paddy bird, and by other names. It is one of the weaver birds (Ploceidæ) and has many Oriental and African congeners. This species seems to be indigenous to Java, but was long ago carried abroad and has become naturalized and to some extent a pest in various rice-growing parts of China, Malaya, India, and Africa, where it is often very injurious to grain crops, after the manner of the bobolink. It is about 5 inches in length, plus a tail 2 inches long, of which the central feathers are longest. The beak is conical and swollen, and rosy in hue, as also are the feet. A narrow edging of red surrounds the eye. The body is slate-colored, rump, tail, and crown black, and there is usually a white patch on the cheek, but these white patches may change to black, regardless of sex or age. The lower parts are purplish gray, becoming white towards the vent. The females are rather lighter and the young somewhat mottled. A snow-white breed has been developed in confinement. These birds are sold everywhere as cage birds, their attraction being mainly their beauty, for the song is brief and of little account. See Plate of CAGE BIRDS.

JAVELIN, jăv′lĭn (OF. *javelin*, *javeline*, Fr. *javeline*, from Bret. *gavlin*, *gavlod*, javelin, *gavl*, *gaol*, fork of a tree, Welsh *gafl*, fork of the thighs, Ir. *gabul*, *gabel*, gable; connected with OHG. *gabala*, Ger. *Gabel*, AS. *geaful*, Eng. *gable*, Skt. *gabhasti*, gable). A long heavy spear, used by ancients for hurling or thrusting. In the Roman legion the first and second lines (the *hastati* and the *principes*) were both armed with two javelins to each man. Each javelin (Lat. *pilum*) was in all about 6¾ feet in length. The shaft was 4½ feet long, of tough wood, an inch in diameter; the remainder was given to the barbed pyramidal head. In action the legionary hurled one javelin on the enemy at the first onset; the second he retained as a defense against cavalry. The Goths and other barbarians used a javelin.

JAVELLE (zhȧ-vĕl′) **WATER.** See HYPOCHLOROUS ACID.

JAWOROW, yȧ-vō′rōv. A town in the Austrian Crownland of Galicia, 29 miles northwest of Lemberg (Map: Austria, H 2). It makes pottery, beer, and liquors and has a large farming industry. The castle with its famous Italian gardens was the favorite resort of the Polish King John Sobieski, and here Peter the Great and Catharine were married. At a short distance is the sulphur spring and bath, Szklo. Pop., 1900, 10,090; 1910, 13,160, mostly Ruthenians, Poles, and Jews.

JAWS. The upper jaw is formed by the union of the two superior maxillary bones. The lower jaw or mandible consists of one bone, the inferior maxillary. The superior maxilla is described as consisting of a body, which is roughly cuboidal in shape, and four processes, viz., the malar, which articulates with the cheek bone; the nasal, into which the thin nasal bones fit; the alveolar, which gives lodgment to the teeth; and the palate, which forms the bony roof of the mouth. The body of the maxilla is hollow and contains the antrum of Highmore; its superior surface takes part in the formation of the orbit, and its internal surface forms the wall of the nostril.

The inferior maxillary bone consists of the body, curved somewhat like a horseshoe, and two perpendicular portions called rami, which join the body nearly at a right angle. Springing upward from the junction of the body and rami are the coronoid processes, which give attachment to the powerful temporal muscles. The upper border of the body presents hollows for the lower teeth, and the outer angle of the jaw gives attachment to the powerful muscle of mastication, the masseter. The upper jaw is fixed, the mandible moving only in chewing.

The joint of the jaw is a condyloid articulation and is formed by the reception of the condyle of the inferior maxilla into the glenoid fossa of the temporal bone. Although firmly bound by five ligaments, dislocation forward often occurs from opening the mouth too widely, as in yawning, as well as by violence. The dislocation is easily reduced by grasping the lower jaw with both hands, the thumbs resting on the lower teeth, pressure being made steadily downward and then backward. The jaw may become fixed as the result of ankylosis of the joint, from injury, syphilis, or chronic arthritis, or as the result of muscular spasm, as in tetanus (lockjaw), or the irritation of an erupting wisdom tooth, or, occasionally, in hysteria. The spongy alveolar processes of the jaws are liable to infection from the teeth or gums, giving rise to necrosis, or more often to alveolar abscess. Necrosis of the jaws was common among workers in match factories under the old process of manufacture, which has generally been discontinued (see OCCUPATIONAL DISEASES), this necrosis being due to phosphorus poisoning. Fracture of the lower jaw is a common injury, resulting nearly always from violence. It is treated by reducing the fragments into their normal position, closing the mouth so that the upper teeth act as a splint, placing a pad of gauze over the point of fracture, and applying a four-tailed bandage. (See BANDAGE.) In many cases it is possible, after a few days, to hold the parts in place by wiring the teeth. Diet must be liquid, and the food introduced through an opening in the teeth.

JAXARTES, jăk-sär′tēz. The ancient name of the Syr Darya (q.v.).

JAY (OF. *jai, gai, gay,* Fr. *geai,* from OF. *gai,* gay, from OHG. *gāhi,* Ger. *gähe, jähe,* quick). A popular English name for a considerable number of birds of the family Corvidæ. They are sometimes separated from the crows as a special subfamily, the Garrulinæ, but it is difficult to define the group satisfactorily. The jays have the wings shorter than the tail, which is long and rounded, or even graduated, and they are generally, but not always, brightly colored, some shade of blue being very characteristic. But these characters will not serve to distinguish them from the magpies, which are very near allies, the so-called blue magpies of the Old World forming an evident connecting link. Jays are smaller than crows and are more distinctly arboreal; when on the ground, they hop. The jays of the Old World belong to genera distinct from those of America, with the single exception of *Perisoreus,* which is circumpolar.

The bird to which the name "jay" was originally given is the common jay of Europe (*Garrulus glandarius*), which is somewhat over a foot in length and beautifully colored, being vinaceous gray varied with black and white, with exquisite black, white, and blue markings on the wings; the head is provided with a conspicuous black-marked crest. It is a common British bird, although its numbers have diminished under the persistent attacks of gamekeepers.

Blue Jay. The best-known American bird of this subfamily is the blue jay (*Cyanocitta cristata*), which is somewhat smaller than its European cousin and is provided with equally beautiful plumage. The general color above is purplish blue and beneath dusky white; forehead, and a yoke-shaped band on the sides of the neck and across the upper breast, black; wings and tail blue, beautifully variegated with black and white. The blue jay is found throughout eastern North America, from Newfoundland and Hudson Bay, south to Florida and the Gulf, and west to the Plains. It breeds throughout its range and is only partially migratory. As spring approaches, the blue jay becomes a quieter, more domestic and retiring bird, and prepares for the breeding season. The nest is well built of twigs and roots, lined with rootlets, and usually placed in a tree in the woods or an old orchard, at some distance from a house. The eggs are four or five in number, brownish olive or ashy green, thickly marked with rather indistinct spots of a darker shade. It is during and after the breeding season that the blue jay's worst traits come to light, for then he becomes an inveterate robber of birds' nests and devours both eggs and young with avidity. At such times he is quiet, sly, and cowardly. Later in the summer insects, nuts, fruits, and seeds form the staples of his diet, and in the winter he will eat almost anything. The notes of the blue jay are numerous and variable; he is a mimic and somewhat of a ventriloquist, but he is not a singer, and most of his cries are harsh and discordant. The blue jay delights in attacking owls and squirrels. While not truly gregarious, blue jays often travel about in small companies, especially during the winter.

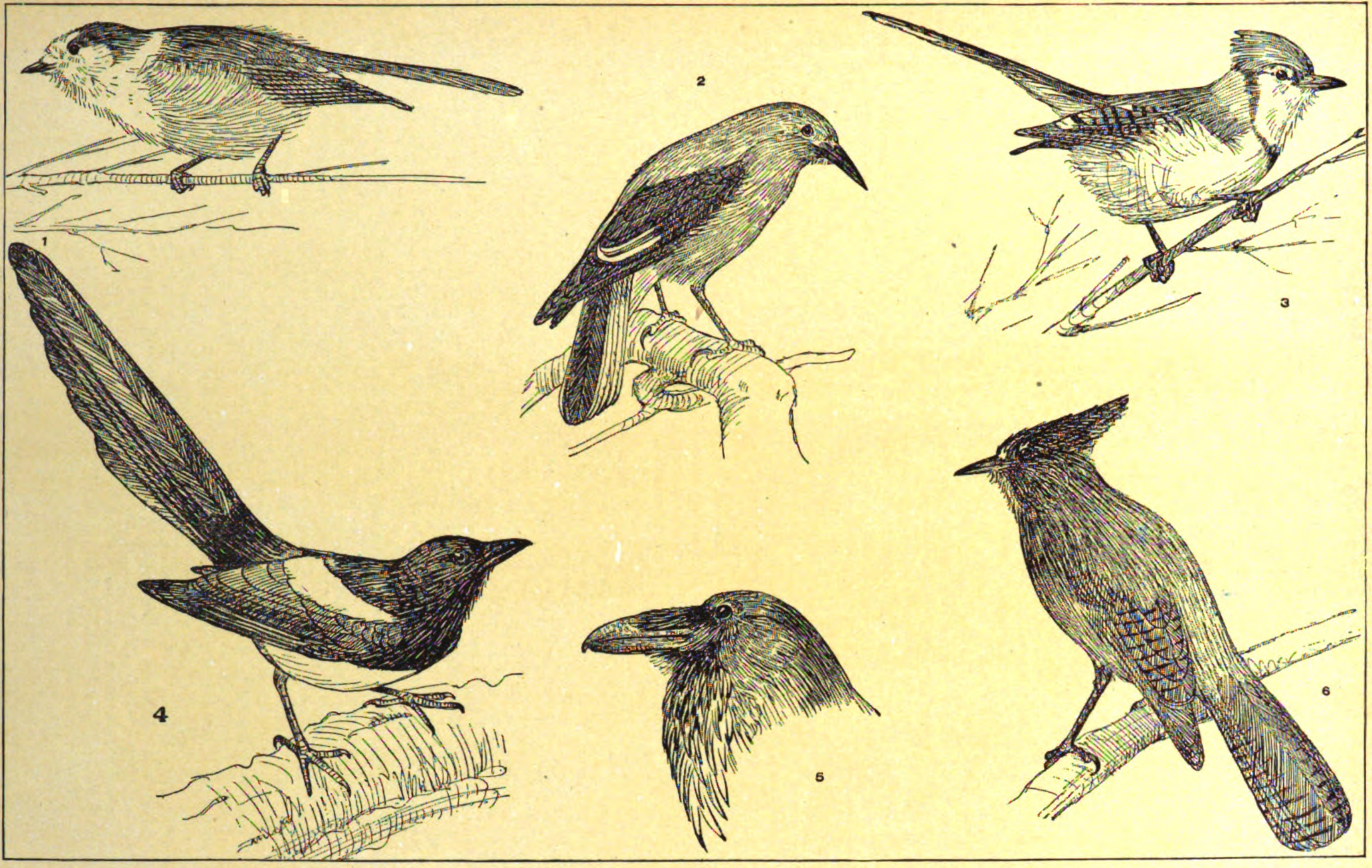
Other American Jays. Several other species of jay occur in North America, variously subdivided by ornithologists into a dozen or more subspecies. One of the most distinct and easily recognized species is the Canada jay, whisky jack, or moose bird (*Perisoreus canadensis*), one of the best-known birds of Canada and the North. Utterly unlike the blue jay in appearance (it lacks a crest), its manners and habits are very similar. The plumage is ashy gray, and only the forehead and throat are white. It becomes very tame about the camps of loggers and trappers in the northern woods and is famous for the great variety of its notes. It breeds very early in the spring, while there is still much snow on the ground and the weather is very cold. The nest is not unlike that of the blue jay, but the eggs are white, spotted with olive brown. This species, in one form or another, ranges throughout North America from Labrador to Alaska, south to the northern tier of States, in the Rocky Mountains to New Mexico and Arizona, and on the Pacific coast to Oregon. The Florida jay (*Aphelocoma floridana,* or *cyanea*) is another crestless jay, but the general color is blue, with more or less white and ashy. It is abundant in Florida, but is wholly confined to that State, although closely allied species occur in the Rocky Mountain region and in California. A well-known and widely distributed Western jay is Steller's jay (*Cyanocitta stelleri*), varieties of which are known as the black-headed jay, blue-fronted jay, and long-crested jay. These birds are especially characteristic of the Rocky Mountain and Sierra Nevada regions, while the typical form is seen from Oregon to Alaska, replacing the blue jay of the East. These jays have the whole head, neck, and back sooty blackish or brownish, the remainder of the plumage blue of some shade, with black markings on the wings. Their habits are similar to those of the Eastern bird. One other North American jay deserves mention, not only because of its beauty, but because it represents a group of jays characteristic of the warmer parts of America, notable for brilliancy of plumage. This is the Rio Grande, or green, jay (*Xanthoura luxuosa*), abundant in some parts of the lower Rio Grande valley. It is about the size of the blue jay, but has no crest, and the prevailing colors are green above and greenish yellow below; but the sides of the head, the chin, throat, and breast, and markings on the wings are black, while the top of the head is rich blue and the forehead is white. The nest and eggs are similar to those of the less gorgeous jays.

Consult: Elliott Coues, *Birds of the Northwest* (Washington, 1874); Dresser, *Birds of Europe* (London, 1879); William Newton, *Dictionary of Birds* (London and New York, 1893–96); L. S. Keyser, *Birds of the Rockies* (Chicago, 1902); Dawson and Bowles, *The Birds of Washington* (Seattle, 1909).

JAY. A town, including several villages, in Franklin Co., Me., about 38 miles northwest of Augusta, on the Androscoggin River and on the Maine Central Railroad (Map: Maine, B 4). There are pulp and paper mills, large granite quarries, novelty works, a corn-canning factory, and a large electric-power plant. Pop., 1900, 2758; 1910, 2987.

JAY, SIR JAMES (1732–1815). An American physician, brother of John Jay. He was born in New York City, studied medicine, and became a practicing physician. He was instrumental in obtaining the endowments for King's (now Columbia) College, New York, and Benjamin Franklin's projected college (now the University of Pennsylvania) in Philadelphia. For the purpose of soliciting contributions for these colleges, he visited England in 1762, where he was knighted by the King, George III. His writings

JAYS, MAGPIES, ETC.



1. CANADA JAY (Perisoreus Canadensis).
2. CLARK'S NUTCRACKER (Picicorvus Columbianus).
3. BLUE JAY (Cyanocitta cristata).
4. MAGPIE (Pica pica).
5. AMERICAN RAVEN (Corvus corax, var. sinuata).
6. LONG-CRESTED JAY (Cyanocitta Stelleri).

include two pamphlets relating to the collections made for the colleges in America (1771 and 1774) and *Reflections and Observations on the Gout* (1772).

JAY, John (1745–1829). An eminent American statesman and jurist. He was born in New York City, Dec. 12, 1745, of French-Huguenot descent, and was the son of Peter Jay, a wealthy merchant. He passed his childhood at Rye, N. Y.; was educated in New Rochelle, N. Y., and at King's (now Columbia) College, where he graduated in 1764; studied law in the office of Benjamin Kissam in New York City; was admitted to the bar in 1768 and soon attained eminence in his profession. In 1770 he was one of the group of lawyers, several of whom later became famous, who formed the professional club known as The Moot. He was made secretary of the commission appointed to determine the disputed boundary between New York and Connecticut in February, 1773, and in April of the following year married, at Elizabeth, N. J., Sarah Livingston, the daughter of William Livingston (q.v.), thus allying himself with one of the most influential Whig families in the Middle Colonies. In the pre-Revolutionary disturbances, though insistent for what he considered to be the rights of the colonists, he allied himself with the conservative element in New York and deprecated the radicalism of such men as Isaac Sears and John Lamb, the leaders of the Sons of Liberty. In May, 1774, he was made a member of the important Committee of Fifty-One in New York, appointed "to correspond with our sister Colonies on all matters of moment," which was controlled by the conservative element and opposed all acts of violence. The answer sent by it to the communication of May 13 from Boston urging New York to concur in a policy of nonimportation and of a discontinuance of trade with the West Indian Islands is attributed to Jay. Jay was a delegate to the First Continental Congress in 1774, was a member of the committee appointed "to state the rights of the Colonies in general," supported Galloway's celebrated plan for an accommodation with the mother country (see Galloway, Joseph), and drafted the address to the people of Great Britain. After his return to New York he was an influential member of the dominating Committee of Inspection and of the Committee of Observation, which succeeded it; was a member of the committee for the relief of Boston, and was also a member of the so-called Provincial Convention, an electoral body, by which he was chosen one of the delegates of New York to the Second Continental Congress. He became a colonel of New York City militia, and in 1776 was chosen a member of the Provincial Congress of New York, by which body he was called away in May from the Continental Congress at Philadelphia, thus failing to become a signer of the Declaration of Independence. Of the Provincial Congress, later called the Convention of the Representatives of the State of New York, which assembled in July, 1776, he was also a member. He drafted the resolution which was passed authorizing the New York delegates in the Continental Congress to sign the Declaration; was chairman of a secret military committee vested with extraordinary powers, which was appointed at the time of Lord Howe's expected passage up the Hudson River; was a member of other important committees; and in December, 1776, was the author of an address issued by the Convention to the people of the Colony. Early in the following year he had an important share in the drafting of the Constitution and Bill of Rights for the State of New York. Upon the adoption of that instrument he was made a member of a Council of Safety and was appointed Chief Justice pro tempore, being regularly confirmed early in September. Late in 1778 he again became a member of Congress, without vacating his seat on the bench, and on December 10 he was elected President of that body to succeed Henry Laurens, in which position he remained until Sept. 28, 1779, when he was succeeded by Samuel Huntington, having previously, on August 10, resigned the chief-justiceship. In September, 1779, he was appointed United States Minister to Spain, and on October 20 started on his mission. He was never officially received by the Spanish government, which, though allied with France and at war with Great Britain, steadily refused to recognize the independence of the United States. Aside from securing a few small loans, he was able to accomplish nothing, and after an unsatisfactory and in many respects a humiliating sojourn of two years he proceeded to Paris in the early summer of 1782 to join Franklin in negotiating the treaty of peace with Great Britain. The two were later joined by John Adams. In this capacity Jay, along with his fellow commissioners, rendered an invaluable service to his country, and he himself is considered to have had perhaps a predominant share, on the American side, in the delicate negotiations which resulted in the signing of the Treaty of 1783. Jay returned to New York in 1784, refusing appointments both to the English and the French court, and from that time to 1789 was Secretary for Foreign Affairs under the Confederation. He strongly approved of the Federal Constitution drawn up by the Philadelphia Convention of 1787 and coöperated with Alexander Hamilton to secure its ratification by New York, writing some of the papers known collectively as the *Federalist* (q.v.), and taking an active part in the debates in the State Convention at Poughkeepsie. He also published anonymously *An Address to the People of New York in Vindication of the Constitution.* Upon the organization of the Federal government Jay was allowed by Washington his choice of all the public offices to be filled by the President's appointment, and chose that of Chief Justice of the Supreme Court, which position he filled with marked dignity and ability until 1795. In 1794 he was sent to England to negotiate with regard to various matters then in dispute between the two countries and concluded with Lord Grenville what is known in American history as the Jay Treaty (q.v.). From 1795 to 1801, for two terms, he was Governor of the State of New York, and thereafter, refusing an appointment to his old position as Chief Justice, he lived in retirement on his estates at Bedford in Westchester Co., N. Y., until his death, on May 17, 1829. Politically Jay was ranked with Hamilton as one of the ablest and most influential leaders of the Federalist party. Consult: William Jay, *Life of John Jay, with Selections from his Correspondence and Miscellaneous Papers* (2 vols., New York, 1833); Whitelocke, *Life and Times of John Jay* (ib., 1887); H. P. Johnston (ed.), *Correspondence and Public Papers of John Jay* (4 vols., ib., 1890–93); Pellew, *John Jay*, in the "American Statesmen Series" (Boston, 1890).

JAY, John (1817–94). An American lawyer and diplomat, son of William Jay (q.v.) and a grandson of Chief Justice John Jay (q.v.). He was born in New York City, graduated at Columbia College in 1836, and was admitted to the bar three years later. He early became intensely interested in the antislavery movement, and while still in college (1834) was president of the New York Young Men's Antislavery Society. He was active in the Free Soil Party movement, presided at several of its conventions, and was once its candidate for Attorney-General of New York. In 1854 he organized the series of popular meetings in the Broadway Tabernacle and the next year was prominently identified with the founding of the Republican party. From 1869 to 1875 he was United States Minister to Austria-Hungary. In 1877 Secretary Sherman appointed him chairman of the special commission to investigate Chester A. Arthur's administration of the New York Custom House. In 1883 Gov. Grover Cleveland appointed him the Republican member of the New York Civil Service Commission, of which he later became president. He published many books and pamphlets on slavery and other questions and in 1889 was president of the American Historical Association.

JAY, William (1769–1853). An English Nonconformist minister, born at Tisbury, Wiltshire. He was apprenticed to his father, a stonecutter and mason; but in 1785 he was sent to school under Cornelius Winter, a dissenting clergyman. He preached at Christian Malford near Chippenham for two years; at Hope Chapel, Clifton, for one year; and in 1791 was ordained pastor of the Argyle Independent Chapel at Bath. He acquired a wide reputation as an eloquent pulpit orator. He published: *The Mutual Duties of Husbands and Wives* (1801; 6 editions); *Sermons* (2 vols., 1802–03); *Short Discourses* (2 vols., 1805); *Morning Exercises in the Closet* (1829; 10 editions); *Evening Exercises* (1831); *Sermons Preached at Cambridge* (5 parts, 1837); a collected edition of his *Works* (12 vols., 1842–48; new ed., 8 vols., 1876); *Autobiography* (1854).

JAY, William (1789–1858). An American reformer and jurist, the son of John Jay (1745–1829). He was born in New York City, graduated at Yale in 1808, and then studied law at Albany, though poor eyesight soon compelled him to give up the profession. He early became interested in various philanthropic enterprises and reforms and identified himself especially with the temperance, antislavery, and antiwar movements. He was one of the founders (in 1816) of the American Bible Society, which he defended against the vigorous attacks of the High Church party; was judge of common pleas in New York from 1818 to 1820; and was first judge of Westchester County from 1820 to 1842, when he was removed on account of his antislavery views. An enthusiastic member of the American Antislavery Society, whose constitution he drafted, he stood with Birney at the head of the conservative Abolitionists, and by his calm, logical, and judicial writings exerted for many years a powerful influence. From 1835 to 1837 he was the society's corresponding foreign secretary. As a protagonist of the antiwar theories, he was also conspicuous, and was for many years president of the Peace Society. His most valuable publication was the *Life and Writings of John Jay* (1833), in which the part played by his father in the diplomacy of the Revolution was first adequately pointed out.

JAYADÉVA, jä'yȧ-dā'vȧ (c.1200 A.D.). A Hindu poet, probably a native of Bengal. His only extant Sanskrit work, a lyric drama called *Gītagōvinda* (Song of the Cowherd), treats of the love, estrangement, and reconciliation of Krishna and the milkmaid Rādhā. Though dating from the twelfth century, it is the earliest literary example of a primitive type of play that still survives in Bengal and must have preceded the regular dramas. The poem, which is in 12 cantos of artistically varied metrical structure, was presumably based on Prakrit originals and is notable for its vivid portrayal of the emotions. At a later time it was interpreted as a religious allegory. Lassen (Bonn, 1836) published the text, with Latin translation and notes, and native editions are numerous, as those by Vidyasagara (Calcutta, 1882) and by Telang and Pansikar (Bombay, 1899). Sir William Jones (London, 1799; new ed., Calcutta, 1894) and Sir Edwin Arnold (*The Indian Song of Songs*, London, 1875) have translated the poem into English, the latter from the allegorical point of view. There is also a German version of part of the drama by Rückert (Göttingen, 1837), which approaches as near to the highly artificial beauty of the original as is possible in a translation. Jayadéva likewise wrote a poem in Hindi, which was published, with a translation by Trumpp, in the *Sitzungsberichte der bairischen Akademie der Wissenschaften* (Munich, 1879). His *Chandraloka*, a treatise on rhetoric, has been edited by Vidyasagara (2d ed., Calcutta, 1906). Consult Macdonell, *History of Sanskrit Literature* (London, 1913).

JAY'HAWKER. A name applied in the Southern and Western States of the American Union to an irregular, lawless, freebooting soldier not enlisted or in uniform—a guerrilla or bushranger. The term originated in Kansas during the bloody strife between the slavery and antislavery parties and is said to have been first applied to a few isolated "Free State" men in the southeastern part of the Territory, who organized a system of retaliation against proslavery outrages, but who ultimately became robbers and assassins. The term appeared in a proclamation of Gen. James Lane in October, 1861, in which he declared that the people of Kansas were neither thieves, plunderers, nor jayhawkers. The term was also applied by General Sheridan during the Reconstruction period to certain lawless persons in Louisiana. Its origin is not certainly known. According to one theory, it was first applied to Colonel Jennison, of New York, who was known among his comrades as the "Gay Yorker," a phrase from which "jayhawker" was corrupted. A more probable theory is that the term was derived from "jay" and "hawk" in allusion to the predatory nature of these birds.

JAYME, hī'mȧ, I and II. Kings of Aragon. See James.

JAYNE, Horace (1859–1913). An American zoölogist and educator. He was born in Philadelphia, was educated at the University of Pennsylvania (A.B., 1879; M.D., 1882), and studied biology at the universities of Leipzig and Jena in 1882–83 and at Johns Hopkins for a year. In 1884 he was appointed professor of vertebrate morphology at the Wistar Institute of Anatomy, University of Pennsylvania, and from 1894 to 1905 was professor of zoölogy and director of the institution; in the university he was secretary of the biological faculty (1884–89) and dean of the college faculty (1889–94). He became a trustee of Drexel Institute and served as coeditor of several scientific journals. His writings include: *Abnormalities Observed in the North American Coleoptera* (1880); *Revision of the Dermestidæ of North America* (1882); *Mammalian Anatomy* (1898).

JAY TREATY. In American history, the name applied to a treaty negotiated in 1794 by John Jay on the part of the United States and Lord Grenville on the part of Great Britain. The refusal of Great Britain to observe several of the obligations imposed by the definitive treaty of peace signed in Paris in 1783, among them the compensation for negroes carried away by the retiring British army and the continuation of garrisons in the forts on the northwestern frontier, had produced a hostile feeling in America that was increased by Great Britain's restrictions on American commerce, her refusal to enter into any commercial treaty with the United States and, beginning in 1793, her insistence on the right of search and impressment. In the winter of 1793–94 war actually threatened. On April 7, 1794, a proposal was made in Congress, in accordance with a recommendation for retaliatory legislation made by the Secretary of State, Jefferson, to prohibit all commercial intercourse with England after Nov. 1, 1794, unless before that date the northwestern forts should be evacuated, and pledges given of a cessation of search and impressment. Before this resolution passed, however, Washington, who feared the result of such an enactment, intervened, and on April 16 sent to the Senate the nomination of Chief Justice John Jay as a special Ambassador to negotiate a treaty adjusting the difficulties. The nomination was immediately confirmed by a vote of 18 to 8, and the House nonintercourse resolution was defeated in the Senate by the casting vote of Vice President Adams. Jay reached London June 15, and on November 19 signed with Lord Grenville a treaty of 28 articles. The evacuation of the forts was the only one of the American claims definitely decided. Nothing whatever was said about either the right of search or impressment, or the question of compensation for the negroes. The settlement of the boundaries on the northeastern and northwestern frontiers was to be decided by a joint commission, as was the question of the collection of British debts. The last 18 articles constituted a treaty of commerce, by the provisions of which, with certain qualifications, trade was to be allowed with Great Britain and the East and West Indies. Further provisions related to the fitting out of privateers, defined contraband goods, and contained a renunciation of all American-European trade in West Indian products, such as sugar, molasses, cocoa, and cotton. One clause, the operation of which was limited to two years from the close of the existing war, provided that American vessels not exceeding 70 tons' burden might trade with the West Indies under certain restrictions. On June 8, 1795, the treaty was laid before the Senate in executive session, and it was ratified June 24 by a vote of 20 to 10, with the exception of the clause relating to trade with the West Indies. On July 2, before the terms of the treaty had been officially made public, its text was published in the *Aurora*, the Anti-Federalist organ in Philadelphia. An outbreak of public wrath and denunciation followed, such as has seldom occurred in the history of the Republic. Jay was burned in effigy from New England to Georgia, and both he and Washington were declared to have been bought with British gold. Even Washington's impeachment was suggested, and the attacks were of such a character as to draw from him the protest that they were "so exaggerated and indecent as could scarcely be applied to a Nero, a defaulter, or even to a common pickpocket." But the outbreak subsided almost as quickly as it had begun, the defenses and explanations of the treaty in the press, particularly in the famous "Camillus" letters of Hamilton and King, brought about a saner state of public opinion, and on April 30, 1796, the House, after debating the question for several months and listening to the able speeches of Fisher Ames and others in its defense, resolved by a vote of 51 to 48 that the terms of the treaty ought to be carried into effect.

Bibliography. Alexander Hamilton, *A Defense of the Treaty of Amity and Navigation Entered into between the United States and Great Britain as it has Appeared under the Signature of Camillus* (New York, 1795); James Monroe, *Views of the Conduct of the Executive in Foreign Affairs of the United States* (Philadelphia, 1797); United States House of Representatives, *Debates in the House of Representatives during the First Session, Fourth Congress, upon Questions Involved in the British Treaty of 1794* (2d ed., ib., 1808); Theodore Lyman, *Diplomacy of the United States* (2d ed., 2 vols., Boston, 1828); John Jay, *Life of John Jay* (2 vols., New York, 1833); Trescott, *Diplomatic History of the Administrations of Washington and Adams, 1789–1801* (Boston, 1857); Hildreth, *History of the United States of America* (rev. ed., 6 vols., New York, 1877–80); Lalor, *Cyclopedia of Political Science* (3 vols., ib., 1893); Thomas Jefferson, *Writings*, ed. by P. L. Ford, vol. vii (ib., 1896); H. C. Lodge, *George Washington*, in "American Statesmen Series" (2 vols., Boston, 1899); G. Pellew, *John Jay*, in "American Statesmen Series" (ib., 1899); E. Smith, *England and America after Independence* (Westminster, 1900); Alexander Johnston, *American Political History, 1763–1876* (2 vols., New York, 1905); J. S. Bassett, *Federalist System*, in "American Nation Series" (ib., 1906); A. B. Hart, *Manual of American History, Diplomacy, and Government* (Cambridge, Mass., 1908), contains a bibliography; McLaughlin and Hart (eds.), *Cyclopedia of American Government* (3 vols., New York, 1914). For the text of the treaty, consult *Treaties and Conventions* (Washington, 1889).

JAZYGES, jăz'ĭ-jēz (Lat., from Gk. 'Ιαζύγες). One of the numerous tribes which by the ancients were comprehensively named Sarmatians (q.v.). They originally occupied the shores of the Black Sea and the Sea of Azov. Later, part of them moved westward, and a detached body of them even settled as far west as the region between the Theiss and the Danube in the centre of modern Hungary. At first friendly to Rome, they later opposed the Romans, under Domitian, and were subdued by Marcus Aurelius during his war with the Marcomanni. Under the Hungarian kings the inhabitants of a part of this region, who had a special military organization, came to be known as Jászok (bowmen), and the district in which they lived received the name of Jászság, which was Latinized into Jazygia. These names have been perpetuated to our times, and at the present day a body of Magyars numbering about 70,000 still figure as Jazygians. See Hungary. Consult "Sarmatia," in Lübker, *Reallexikon der klassischen Altertums* (8th ed., Leipzig, 1914).

JEAFFRESON, jĕf'ĕr-son, John Cordy (1831–1901). An English author. He was born Jan. 14, 1831, at Framlingham, Suffolk, England, where his father was a surgeon. He began the study of medicine, but, changing his intentions, he went to Oxford and from there to Lincoln's Inn, where he was admitted to the bar in 1859. In 1854 he published his first novel, *Crewe Rise*, which was followed by *Live it Down* (1863), *Not Dead Yet* (1864), *A Woman in Spite of Herself* (1872), and several others. In 1858 appeared *Novels and Novelists from Elizabeth to Victoria*. But his most important works are his three books on the three learned professions, *A Book about Doctors* (1860; an Amer. ed., Akron, Ohio, 1904); *A Book about Lawyers* (1866); *A Book about the Clergy* (1869). Other works are the *Annals of Oxford* (1871); *Brides and Bridals* (1872), a history of marriage in England; *A Book about the Table* (1875); *The Real Lord Byron* (1883); *The Real Shelley* (1885); *Lady Hamilton and Lord Nelson* (1888; revised in 1897); *A Book of Recollections* (1894). He was also a frequent contributor to the *Athenæum, Fraser's Magazine,* the *Dublin University Magazine,* and to other periodicals as well as to the London daily press.

JEALOUS WIFE, The. A comedy by George Colman the Elder (1761). The plot is said to have been partly taken from Fielding's *Tom Jones*.

JEAMES, jēmz. A pseudonym used by Thackeray in his *Jeames's Diary,* contributed to *Punch*. From this diary of a footman the name has become a popular term for a flunkey.

JEAN CRAPAUD, zhäɴ krȧ'pō'. A Frenchman. See National Nicknames.

JEAN DE PARIS, zhäɴ de pȧ'rē'. An opera by Boieldieu (q.v.), first produced in Paris, April 4, 1812; in the United States, Sept. 28, 1827 (New York).

JEANES, jēnz, Anna T. (1822–1907). An American Quaker philanthropist, born in Philadelphia. Her benefactions included $200,000 to Spring Garden Institute, Philadelphia, a technical school; $100,000 to the Hicksite Friends; $200,000 to the Quaker schools of Philadelphia; and $200,000 to the Home for Aged Friends, an institution where she spent the closing years of her own life. In 1907 she transferred to the trusteeship of Booker T. Washington and Hollis B. Frissell the sum of $1,000,000 to be known as "The Fund for Rudimentary Schools for Southern Negroes" and to be used exclusively for the benefit of elementary negro schools in the South. Her $45,000 bequest to Swarthmore College was refused because of the condition that the college give up intercollegiate sports. See Jeanes Foundation.

JEANES (Anna T.) **FOUNDATION.** In 1907 Miss Anna T. Jeanes, of Philadelphia, left a sum of $1,000,000 for the purpose of fostering negro education. The board administering the fund aims to secure the coöperation of existing educational authorities to develop improved means of education for the negroes. Its activities, which are confined to the Southern States, are exercised in three directions: (1) securing the appointment of teachers to direct and supervise industrial education; (2) encouraging through the appointment of teachers the development and supervision of extension work; and (3) appointing county agents to supervise the schools, stimulate public interest in the schools, and to improve home conditions. The board does not seek to assume the burden of expense on this work, but rather to point the way for new educational endeavor. The work is constructed in close coöperation with the General Education Board (q.v.).

JEAN JACQUES (zhäɴ zhȧk) **I.** The title given to the negro military leader Jean Jacques Dessalines (q.v.).

JEANNE D'ALBRET, zhän dȧl'brā'. See Albret, Jeanne d'.

JEANNE D'ARC, därk. See Joan of Arc.

JEANNE D'ARC. An opera by Gounod (1873).

JEANNETTE, jĕn-nĕt'. A borough in Westmoreland Co., Pa., 27 miles east by south of Pittsburgh, on the Pennsylvania Railroad (Map: Pennsylvania, B 6). It is supplied with natural gas and has important manufactures of window glass, flint glass, tableware, lamps and shades, mine fans, rubber goods, bottles, etc. Oakford is the principal park. Jeannette was settled in 1888 and incorporated in the following year. The government is administered by a burgess, chosen every four years, and a borough council, elected on a general ticket. Pop., 1900, 5865; 1910, 8077; 1914 (U. S. est.), 9020.

JEANNETTE EXPEDITION. See Polar Research; De Long.

JEANNIN, zhȧ'năɴ', Pierre (1540–1622). A French statesman, born at Autun. He was educated under Cujas, was an advocate at the Parlement of Dijon in 1569, and councilor in 1572, and as advocate of the State of Burgundy (1579) he was unable to prevent the St. Bartholomew Massacre from extending to his district. When councilor to the Duke of Mayenne, he strove to bring about a reconciliation between him and Henry IV, who took him into his own service in 1595, and he was made Intendant of Finances in 1602 and General Comptroller in 1610. A commissioner for the Treaty of Lyons with the Duke of Savoy, he was afterward instrumental in forming the important alliance between France and Holland in 1608, whereby Spain was obliged to acknowledge Dutch independence. Always on the side of conciliation, he tried to make peace between Louis XIII and Maria de' Medici. His *Négociations* were published posthumously in 1656 (2 vols.), in 1659 (3 vols.), in 1819, and in 1837, while they are to be found also in *Nouvelles collections des mémoires pour servir à l'histoire de France,* vol. iv (2d ser., 1887).

JEAN PAUL, zhäɴ pōl. See Richter, Johann Paul.

JEAN POTAGE, pō'tȧzh' (Fr., John Pottage). A nickname of the French, based on their fondness for soups and sauces.

JEANRON, zhäɴ'rôɴ', Philippe Auguste (1807–77). A French painter, born at Boulogne-sur-Mer. He was a pupil of Sigalon and Souchon and exhibited genre painting from 1831 to 1838, when he took up landscape. Without ceasing to paint he began to write criticisms for the magazines and newspapers and founded a Free Society of Painting. After the events of June 13, 1848, he saved the life of Ledru-Rollin by hiding him in the Louvre for 12 days and in the same year, on the success of the Revolution, was appointed by Ledru-Rollin director of the national museums, holding office until 1850. He greatly improved the arrangement and classification of the various collections of the Louvre, founded the Luxembourg Museum, and gave many commissions to painters of the modern school, now held in high favor but then despised. Among his best paintings are: "The Isle of Calypso," at Bayeux; "Limoges Peasants," at Lille; "Beheading of John the Baptist," at Rouen; "Mirabeau," at Versailles. He is to be classed with the Barbizon school (see Barbizon, The Painters of), in which he was a painter of some distinction.

JEBAIL. See Jebeil.

JEBB, John (1775–1833). An Irish theologian, Bishop of Limerick. He was born at Drogheda, graduated M.A. at Trinity College, Dublin, in 1801, and in 1810 became curate at Mogorbane, Tipperary. Twelve years afterward Jebb was made Bishop of Limerick, Ardfert, and Agadhoe as a recognition of his services in the distress and disquiet following the famine of 1822. Jebb's great work in the Church was the reform of theological examinations. He favored High Church ritual, many services and communions, and has been reckoned a forerunner, with his friend Alexander Knox, of the Oxford movement. Jebb wrote several volumes of sermons, and his correspondence with Knox was published in 1836. Consult Charles Foster (ed.), *Thirty Years' Correspondence between John Jebb and Alexander Knox* (2d ed., 2 vols., London, 1836); James Wills, *Lives of Illustrious Irishmen*, vol. vi (Dublin, 1847).

JEBB, Sir Richard Claverhouse (1841–1905). An eminent Scottish classical scholar. He was born at Dundee, Scotland, and was educated at St. Columba's College, Dublin, the Charterhouse School, London, and Trinity College, Cambridge, where he graduated with the highest honors in 1862. In 1871 he became governor of Charterhouse School and in 1872 was appointed classical examiner in the University of London and tutor of Trinity College. Three years later he was called to the chair of Greek in the University of Glasgow and in 1889 was made regius professor of Greek in the University of Cambridge. Jebb was instrumental in establishing in 1886 the British School of Classical Studies at Athens. He was president of the Society for the Promotion of Hellenic Studies from 1891 to 1905; from 1891 also he was member of Parliament from the University of Cambridge. In 1900 he was knighted. He received honorary degrees from the universities of Edinburgh, Cambridge, Bologna, and Harvard; in 1878, in recognition of his high attainments and his earnest advocacy of the teaching of modern Greek, he was presented with the gold cross of the Order of the Saviour by the King of Greece. His numerous works are all distinguished by great scholarship and brilliant style. Among them the most important are: *The Characters of Theophrastus* (1870; 2d ed. by Sandys, 1909); *Attic Orators* (2 vols., 2d ed., 1893); *Richard Bentley* (English Men of Letters Series, 1882); *Homer* (1887); *A Complete Edition of Sophocles*, with critical notes, commentary, and translation (8 vols., Cambridge, 1883–1903; some plays reached a third edition); an edition of Bacchylides, with text, translation, and notes (ib., 1905); a translation of the *Rhetoric* of Aristotle, published after his death by Sandys (1909); *Essays and Addresses*, also collected and published after his death (Cambridge, 1907); and many monographs on philological subjects. In 1892 he was Turnbull lecturer at Johns Hopkins University. The lectures there delivered were published under the title *The Growth and Influence of Classical Greek Poetry* (1893). Consult Caroline Jebb, *Life and Letters of Sir Richard Claverhouse Jebb* (Cambridge, 1907), and Sandys, *A History of Classical Scholarship*, vol. iii (ib., 1908).

JEBEIL, je-bil′, or **JEBAIL.** A town in Syria, Asiatic Turkey, situated near Mount Lebanon, 18 miles from Beirut. It is believed to occupy the site of the ancient city of Byblos (q.v.). Pop., about 2500.

JE′BEL BARKAL. See Barkal.

JEBEL ESH SHEIK. See Hermon, Mount.

JECKER, zhe-kâr′, Jean Baptiste (c.1810–71). A Swiss banker, whose difficulties with the Mexican government are said to have been one of the causes which led to the French intervention. He was born at Porrentruy in the Canton of Bern. About 1836 he went to Paris, where he entered the banking house of Hottinguer. His brother, who had achieved considerable fame as a physician in Mexico, persuaded him to emigrate to that country, and there he founded a bank which soon grew to be of the first importance. In 1859 President Miramón confided to it the conversion of the domestic debt, for which Jecker charged an enormous commission; but President Juárez refused to recognize the agreement which had been made by his predecessor. Jecker had further obtained from the government authority to explore Sonora and Lower California; but in spite of this the members of his surveying parties were expelled from the territories. When Napoleon III decided to intervene in Mexican affairs, Jecker ceded to the French government for 10,000,000 francs all his rights in Sonora. In 1861 the Mexican government acknowledged its indebtedness to Jecker, which was fixed at 27,703,770 francs. In order to secure prompter payment he consented that this sum should be reduced to 22,660,000 francs and should be paid in three installments—the first, of 7,660,000 francs, on Oct. 15, 1865; the second, of 5,000,000 francs, on December 15; and the third, of 10,000,000 francs, on Feb. 15, 1866. The first two installments were paid; but Maximilian refused to authorize the third, for this arrangement, besides being disastrous to the Mexican Treasury, was a drain on that of France. Jecker returned to France, was arrested by the Commune in 1871, and shot on May 26.

JEDBURGH, jĕd′bŭr-ŭ. A royal and police borough, the capital of Roxburghshire, Scotland, on the Jed, 56 miles southeast of Edinburgh (Map: Scotland, F 4). It has the interesting remains of the magnificent abbey of Austin Canons, founded by King David I in 1118, and of a castle where William the Lion, Alexander II, and other Scottish kings frequently resided. It has also a fine modern grammar school, county buildings, and town hall. Industry includes the manufacture of blankets, beer, leather, and ironwork. Pop. (police borough), 1901, 3136; 1911, 2752. Consult Watson, *Jedburgh Abbey* (Edinburgh, 1877).

JED′DAH. A city of Arabia. See Jiddah.

JEEJEEBHOY, jē′jēb-hoi′, Sir Jamsetjee (1783–1859). A Parsi merchant prince and philanthropist, born in Bombay. At an early period he showed a great aptitude for mercantile pursuits, and in consequence his father-in-law, Framjee Pestonjee, a Bombay merchant, took him into partnership. While still young, he visited most of the maritime countries of Asia, besides Egypt, Syria, and England. By the year 1820, when he had completed his twentieth year of business, he had amassed an immense fortune and was universally acknowledged to be the first merchant in the East. He now began to manifest on a magnificent scale his benevolence and between 1822 and 1858 gave upward of $1,000,000. Parsi and Christian, Hindu and Mussulman, were alike the objects of his beneficence. Queen Victoria conferred on him the honor of knighthood. Other honors followed, and in 1857 he was made a baronet of the United Kingdom. He was succeeded in the baronetcy by his eldest son, Cursetjee Jamsetjee Jeejeebhoy, who, in accordance with his father's will, took his father's name.

JEFFERIES, jĕf′rĭz, RICHARD (1848–87). An English author, born near Swindon, Wiltshire, Nov. 6, 1848. Being wild and restless, he attempted to run away to America when only 16 years old. Later he began to write for the papers and published novels of no moment. He went to London in 1876 and was soon known by his *Gamekeeper at Home* (1877), a remarkable series of nature studies originally contributed to the *Pall Mall Gazette*. This book was followed by *Wild Life in a Southern County* (1879) and other similar but less artistic books on nature. He now took up the novel again, enduing it with perhaps the most subtle appreciation of nature to be found in the entire range of English fiction. His finest work is represented in *Wood Magic* (1881), depicting the life of animals, *Bevis* (1882), and in *The Story of my Heart* (1883) and *Life of the Fields* (1884), the two last-named works, together with the *Gamekeeper at Home*, being his most popular books. In a different vein is the powerfully conceived *After London*, a romance of England after she shall have lapsed into a wilderness (1885). Jefferies died in poverty at Goring, Essex, Aug. 14, 1887. Consult Besant, *Eulogy of Richard Jefferies* (New York, 1888); A. Rickett, *A Vagabond in Literature* (ib., 1906); E. Thomas, *Richard Jefferies: Life and Work* (Boston, 1909).

JEFFERS, jĕf′ẽrz, WELLINGTON (1814–96). A Canadian Methodist clergyman and journalist. He was born in Cork, Ireland, and in early youth was brought by his parents to Kingston, Ontario. He studied for the ministry of the Wesleyan Methodist church and was ordained in 1841. During the greater part of his ministerial career (1841–84) he filled prominent pastorates in Ontario. He was for several years chairman of the district, became secretary of the conference (1853), codelegate (1866), and president of the conference (1879). In 1884 he retired from active work. He was editor of the *Christian Guardian*, the official organ of Canadian Methodism, in 1860–69. He was known throughout English-speaking Canada as a pulpit orator, the vigor and effect of his sermons and addresses being due to his command of extempore speech. He was conservative in his theological outlook and in that behalf wielded a strong influence in the councils of his church. In 1863 the degree of D.D. was conferred upon him by Victoria University.

JEF′FERSON. A city and the county seat of Marion Co., Tex., 48 miles by rail northwest of Shreveport, La., on the navigable Cypress Bayou, and on the Missouri, Kansas, and Texas, the Jefferson and Northwestern, and the Texas and Pacific railroads (Map: Texas, E 3). It is in a region rich in iron ore; has extensive foundries, machine shops, and iron furnaces, cottonseed-oil mills, and several saw mills; and is an important shipping point for cotton, produce, live stock, etc. The cultivation of vegetables and fruits is extensively carried on in the vicinity. The county courthouse, Carnegie library, high school, United States government building, and an iron bridge across the Bayou are the leading architectural features of the city. Jefferson was settled in 1850 and first incorporated in 1866. It is governed under a general law of 1875 which provides for a mayor, elected biennially, and a council. The water works are owned by the city. Pop., 1900, 2850; 1910, 2515.

JEFFERSON. A city and the county seat of Jefferson Co., Wis., 49 miles by rail west of Milwaukee, at the junction of the Rock and Crawfish rivers and on the Chicago and Northwestern Railroad (Map: Wisconsin, E 5). It has the county asylum for the insane, St. Colletta Institute for Defective Children, and a Carnegie library. There are breweries, a pork-packing plant, creameries, and manufactures of boots and shoes, furniture, motor cycles, cigars, yarn, condensed milk, agricultural implements, wagons and carriages, brick and tile, sash, doors, blinds, etc. Jefferson, settled in 1837, is governed, under a general State charter, by a mayor, chosen every two years, and a council. The water works and electric-light plant are owned and operated by the municipality. Pop., 1900, 2584; 1910, 2582.

JEFFERSON, CHARLES EDWARD (1860–). An American Congregational clergyman, born at Cambridge, Ohio. He graduated from Ohio Wesleyan University in 1882 and from the theological department of Boston University in 1887. In 1882–84 he was superintendent of public schools at Worthington, Ohio. Ordained to the Congregational ministry in 1887, he was pastor at Chelsea, Mass., until 1898, and thereafter occupied the pulpit of the Broadway Tabernacle, New York City. In 1914 he became chairman of the executive committee of the Church Peace Union, endowed by Andrew Carnegie. He is author of *Quiet Hints to Growing Preachers in my Study* (1891); *Quiet Talks with Earnest People in my Study* (1898); *Doctrine and Deed* (1902); *Things Fundamental* (1903); *The Minister as Prophet* (1905); *Faith and Life* (1905); *The New Crusade* (1907); *The Character of Jesus* (1908); *My Father's Business* (1909); *The Christmas Builders* (1909); *The Building of the Church* (1910, 1913); *Why we may Believe in Life after Death* (1911); *The Minister as Shepherd* (1912).

JEFFERSON, JOSEPH (1829–1905). A distinguished American actor, the fourth of a line of actors, of whom his father and grandfather bore the same name. His mother had been Mrs. Burke, a singer of distinction. He was born in Philadelphia, Feb. 20, 1829, and from infancy was upon the stage, appearing as Cora's child in Kotzebue's *Pizarro* when only three years old, and with Rice as a miniature "Jim Crow" when four years old. In 1838 his father removed to the West, playing in Western and Southern cities. They went in 1842 to Mobile, where his father died of yellow fever, and for several years after this Joseph went through the hard training of a strolling actor, playing minor parts in many cities of the United States and in Mexico. After his return to the East, in 1849, his circumstances improved, and the next few years were largely spent in various cities of the South. In 1856 he made his first visit to Europe. Returning again to New York, he became a member of Laura Keene's company, and in her newly opened theatre in 1857 appeared as Dr. Pangloss in *The Heir-at-Law*, Caleb Plummer in *The Cricket on the Hearth*, and in several less important rôles. In 1858 he played with E. A. Sothern in Miss Keene's production of *Our American Cousin*, really creating the part of Asa Trenchard. It was while acting in *Our American Cousin* that he began his search in literature for a character combining both humor and pathos, which he finally found in Irving's *Rip Van Winkle;* but his dramatization of the sketch was so unsatisfactory to himself that it was afterward altered and amplified by Boucicault. In its new form it became Jefferson's most famous rôle. He played it for the first time in London, in 1865, and afterward this character, Dr. Pangloss, Caleb Plummer, and Bob Acres in *The Rivals* (which he revived in Philadelphia in 1880) were the principal ones in his repertory. He also acquired a considerable reputation as a landscape painter in oils. Mr. Jefferson was twice married—to Miss Margaret Lockyer in 1850 and, after her death, to Miss Sarah Warren in 1867. He owned a fine plantation in Louisiana, and when not on the stage spent his winters there. He was a member of the American Academy of Arts and Letters. His *Autobiography* (New York, 1890) is full of interesting allusions to many contemporaneous actors and actresses.

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JEFFERSON, THOMAS (1743–1826). Author of the Declaration of Independence, and third President of the United States, born at Shadwell in Albemarle Co., Va., April 2, O. S. (April 13, N. S.), 1743. His father was Peter Jefferson, a man of some prominence in his community; his mother was Jane Randolph, a sister of William Randolph, of Tuckahoe. Thomas was educated first in a common school, in the ordinary studies for a boy of seven, and when nine years old the Rev. Mr. Douglas gave him instruction in French and in the classical languages. He prepared for college under the tuition of the Rev. Mr. Maury and at the age of 17 became a student in William and Mary's College. Jefferson did well in the classics, in French, Italian, and Spanish, and acquired an equipment in mathematics and science such as was rarely had save by special students. On leaving college he turned his attention to law and studied for about five years under George Wythe, the head of his profession in Virginia. In 1767, at the age of 24, he was admitted to the bar; but, although successful, he never took the interest in the practice of his profession that he took in scientific farming and gardening, and he continued it only seven years.

In 1769 Jefferson took his seat in the House of Burgesses, elected on the arrival of the new Governor, Lord Botetourt. A set of too independent resolutions brought about the dissolution of the assembly; but before returning home the Burgesses met at the Raleigh Tavern and adopted a nonimportation agreement, of which Jefferson was one of the signers. The question of emancipating slaves was then being agitated in England, but little had been heard on the subject in the Colonies. Jefferson proposed an act which would give masters the right to free their slaves whenever they thought proper; but the bill failed to pass, and the principle was not established until 17 years later.

His term over, he removed to an unfinished house (subsequently famous as Monticello), and on New Year's Day, 1772, married Martha Skelton, daughter of John Wayles, and widow of Bathurst Skelton.

In March, 1773, when the House of Burgesses came together again, Jefferson, Henry, and others of advanced opinions undertook to form a committee of correspondence for the spread of political intelligence in the Colonies. This scheme had scarcely been adopted and the committee selected when the Governor dissolved the House. In the spring of 1774, however, all of the old members reappeared in their seats, and while this session was in progress news came of the Boston Port Bill. Jefferson, with some of the other leaders, succeeded in having a resolution passed to observe a day of prayer and fasting, and again the Governor resorted to dissolution. The Burgesses in a secret meeting requested the Committee of Correspondence to consult with the other Colonies as to the expediency of a general congress, and then resolved in favor of a meeting of representatives from the counties of Virginia, to be held at Williamsburg on August 1. Jefferson was chosen a representative, but was prevented by illness from attending. He forwarded, however, to Peyton Randolph, the president of the convention, a draft which he hoped to see adopted as instructions to the delegates to be selected for the Colonial Congress. When presented, copies of this document were ordered to be printed, and this first of Jefferson's political writings appeared in pamphlet form as *A Summary View of the Rights of British America*. It spelled virtual independence and was sent to England, where, after receiving some interpolations from the pen of Edmund Burke, it was published and widely circulated—a circumstance which Jefferson regarded as the reason for including his name with others in a bill to punish sedition. In the session of the convention held in the spring of 1775 Jefferson was on the committee to see to the defense of Virginia, and in the expectation that Peyton Randolph might be called home he was elected to the Continental Congress. This vacancy did occur soon; but before he left for Philadelphia he drew up for the Burgesses an answer to the "conciliatory propositions" which the English government had made to the Colonies. This reply, the earliest made by any of the Colonies, was anxiously expected in Congress, and when it was brought by the author it was vigorously indorsed. Jefferson was no debater, for, besides having a poor voice, he hated contest; but his courtesy, his intellectual keenness, his wide political knowledge, and his power of expression gained him hearty respect, and he soon became the recognized document writer to the assembly. The answer of Congress to Lord North's "conciliatory proposition" was intrusted to Jefferson, who based his paper on the reply he had previously written for Virginia. In the winter of 1775–76 it became so plain that there was no possibility of a reconciliation that Virginia in the following spring instructed her delegates to urge on the final breach. On June 7 Richard Henry Lee presented resolutions to this effect, and before the month was out Jefferson, who was placed first on the drafting committee, presented his report. On July 2 Lee's resolution was passed, and on the same day Jefferson's draft was taken up. The author took no part in the warm discussion over the document, for which, with the exception of a few verbal changes by Franklin and Adams, he was solely responsible. Late in the day of July 4 the Declaration was adopted.

Jefferson did not take his seat at the next session of Congress, because he thought he could best serve his country by preparing the laws of his State for the changed conditions the new government would bring with it. In this task he was not working single-handed, but the initiative was almost entirely his own. In October, 1776, Jefferson took his seat in the Virginia House of Delegates, where for two years he labored incessantly at revising the whole Virginia code, reforming old and proposing new laws. In spite of the opposition of the privileged classes, the old aristocratic framework of Virginia society was in a brief time replaced by a democratic one. In June, 1779, a time when the Revolution looked most hopeless for the Americans, Jefferson was elected Governor of the State where the struggle was to be ended. Virginia had supplied to the Revolution 10,000 men, besides all the horses and arms possible, and Jefferson's first duty was to keep up as well as he could this support. Soon, however, the British pushed the war in the South. In April Cornwallis sent Tarleton to capture the Virginia Legislature, then at Charlottesville, but he succeeded only in dispersing it. Jefferson himself narrowly missed capture at Monticello by a party sent after him. His conduct during this period has been the subject of much thoughtless censure. He was not, indeed, fitted to be a "war Governor," but his course had Washington's substantial approval, for the commander in chief recognized that Virginia was without means of defense and that it was impossible for any one to defend it, and in December, 1781, the Virginia House of Delegates were unanimous in a resolution exonerating him from all censure. Jefferson's wife, to whom he had been singularly devoted, died at this time, and he retired from the Governor's chair to his home, where he remained until called by Congress to be one of the commissioners to arrange the treaty of peace. He left home, but found that matters had gone so far that he could be of no practical service, and he did not sail. In 1783 he took his seat in Congress and did much to strengthen a body fallen into something like contempt for its incompetence. His most important service here was his successful advocacy of the decimal system of coinage, which had been devised by Gouverneur Morris, and the drawing up a plan for the government of the territory to the northwest of the Ohio River. In the latter plan there was the provision for the prohibition of slavery, which, though rejected at first, finally secured all of the vast domain to freedom.

In May, 1784, Jefferson, Franklin, and Adams were sent to Europe under a general power to make commercial treaties. In 1785 Jefferson succeeded Franklin as American representative to France. The diplomatic fruits of this stay are not specially remarkable, because Europe was much concerned with internal troubles and little interested in the affairs of the new nation across the Atlantic. By his personal charm, however, by his sympathy with French ideas, and by the influence of his *Notes on Virginia*, now published with his consent, Jefferson did much to set the United States in a favorable light in Europe. Having as his official duty to attend to the ignoble tribute by which the commercial nations of the time warded off the Algerian pirates, he protested vigorously that a war would be not only more honorable, but much cheaper. On a brief and unsatisfactory mission to England he got a first-hand confirmation of the insolence with which the Americans were there treated. He traveled in Italy and Germany and in Paris became intimate with D'Alembert, Condorcet, and other extreme liberals, with whom his intellectual affinity was marked. In 1789 he returned to America and under Washington became first Secretary of State. The organization of the government had defined political parties, and hardly was Jefferson in office before he was recognized as the leader of the Democratic Republicans (afterward known first as the Republicans and then as the Democrats), while Alexander Hamilton was the leader of the Federalists. Hamilton favored a strong Federal government and distrusted the people; Jefferson insisted on State sovereignty and regarded the people with the most optimistic faith; Washington held views more moderate than either. Most of Hamilton's definite propositions have been adopted by the government, but Jefferson's spirit has given them life. The two new parties came into sharp contention over the question of neutrality when in 1793 France declared war against England. The followers of Jefferson held that the United States was bound by gratitude and treaty to aid the French Republic; those of Hamilton argued that the treaty was not now in force, and that motives of self-preservation were stronger than the obligation owed for help during the Revolution. Washington finally issued a neutrality proclamation, but at the same time declared that he would receive the Minister of the Republic, Genet. "Citizen Genet," as he was called, acted with what was considered to be outrageous disregard for international etiquette and was recalled, but the bitterness between Hamilton and Jefferson was never removed.

Jefferson's secretaryship had not been congenial to him, and at the call of some private business he retired Dec. 31, 1793. Washington's announcement in September, 1796, that he would not be a candidate for a third term, led to the nomination of Adams, then Vice President, and Jefferson by the Federalists and the Democratic Republicans respectively. Adams, having received the highest vote, was chosen President, and Jefferson, having the next highest, was, under the law of the time, chosen Vice President. As the duties which Jefferson had now to perform were chiefly secondary, he was able to spend most of his time at home, where, nevertheless, he continued to direct the party of which he was the head. The excesses of the French in the Reign of Terror caused a great reaction in America against Republican doctrines, and the Directory now in control in France seemed bent on having war with the United States. The American envoys were treated with insolence, and later the shameful incident of the "X. Y. Z." letters brought not only the quick-tempered Adams but also all but the most devoted followers of Jefferson to a strong desire for war. This calamity was avoided because the French Minister, Talleyrand, seeing that he had overstepped himself in his knavery, now proclaimed the whole thing a mistake. The war feeling had, however, carried the President and his supporters so far that they felt justified in having the Alien and Sedition Laws passed for the protection of the government—the former making it possible to expel from the country any alien suspected of treason, and the latter making defamation of the government a crime punishable by a heavy fine. Jefferson on this provocation drew up the Kentucky Resolutions, which seemed strongly to manifest his belief in the right of a State to secede, although this is not absolutely implied and at least does not seem to have remained his fixed opinion.

The election of 1800 resulted, after a campaign marked by great bitterness, in the election of the Republican candidates, Jefferson and Burr receiving the same number of votes. The decision fell to Congress, where Jefferson was chosen, chiefly through the influence of his opponent, Hamilton, who was too much of a patriot to desire the success of Burr. Although the Federalists, especially of New England, predicted a revolution, Jefferson made astonishingly few removals from office for purely political reasons, was painstaking in his selections for vacancies, and by his popularity drew from the Federalist party much of its vital energy. The stately formalities that had marked the inauguration of the preceding Presidents were omitted. Jefferson rode horseback, without attendants, tied his horse to the fence, and walked unceremoniously into the Senate chamber. He also sent written messages to Congress, and the practice of the President in addressing Congress in person was not revived until 1913. These changes in official etiquette were paralleled in manners and dress; knee breeches gave way to trousers, and simplicity, for which the President set an unostentatious example, became the order of the day.

The most important event of Jefferson's quiet first term was the purchase of Louisiana from the French. This step was deemed unconstitutional by him, but the necessity of controlling the Mississippi and the obvious need of haste abundantly justified the action. A little war with Tripoli, the first opposition that the Algerine pirates had received, led to the extinction of the tribute paying to which Jefferson had so objected. The exploration of the Far West was undertaken, and settlements across the Mississippi were generously assisted. Four years of prosperity and the almost complete disintegration of the Federalist party led to Jefferson's reëlection in 1804 by 162 votes out of 176. Burr's scheme to invade Mexico to set up an empire brought about his trial for treason, and the prosecution gave Jefferson's enemies the opportunity to accuse him of gross partisanship. Jefferson's second term is remarkable for his consistent and on the whole unsuccessful attempt to apply to foreign affairs principles of action so far in advance of his time that we have not yet arrived at them to-day. The long wars between France and England had made these two nations utterly careless of the rights of neutrals. The United States, as the principal carrier of neutral goods, suffered most, her ships being attacked by both nations and her crews being impressed into British service. This impressment by the British went on in spite of protest until a crisis was reached in June, 1807, when the British ship *Leopard* fired into the American frigate *Chesapeake* (q.v.). Redress was demanded, but the British government refused to touch the fundamental cause of the trouble, impressment. The measures that Jefferson recommended in retaliation were those of commercial restriction such as had been not without effect in the eighteenth century. The Embargo of 1807 forbade American vessels to leave for foreign ports, and the Enforcement Act of 1808 put heavy penalties on the violation of the embargo. These acts proved without effect as far as changing the attitude of the British was concerned and brought great distress on the tobacco industry of Virginia and on the commerce of New England and the Middle States. This policy was abandoned early in 1809. In December, 1806, Jefferson successfully recommended to Congress the prohibition of the slave trade. Following the example of Washington in the refusal to be elected a third time to the presidency, Jefferson, at the close of his second term, took up the care of his plantation at Monticello. Here he ceased entirely from active political life, but by means of his facile pen still exerted an important influence on the government, especially upon his successors and disciples, Madison and Monroe. His house was the Mecca to which all America seemed to turn, his open and generous hospitality finally bringing financial distress upon him—a distress that both the government and private individuals helped to relieve. Jefferson's chief public service during this period was the founding of the University of Virginia, in which he unfolded some highly original ideas regarding higher education by the state, and here, as at Monticello, exhibited remarkable tastes as an architect. Another mark of Jefferson's versatile genius was his proficiency in music, especially in playing the violin. In June, 1826, his health failed rapidly, and he died July 4, the same day that his predecessor in office, John Adams, passed away.

In person Jefferson was tall (6 feet, 2 inches), with a bony but strong frame, angular features, ruddy complexion, sandy or reddish hair, and light hazel eyes. In dress and bearing he was so far removed from the formal as to be almost slovenly. His manners were remarkably winning, and his disposition very kindly, not only to his family and his friends, but to his slaves. While not precisely learned, he probably had the most receptive mind of his generation, and it is by no means certain that, although he was on the whole a far from strong executive, he was not the most influential statesman of his day. In religion it is probable that he was not far from what was then known and execrated as a freethinker: as an idealist, he did not underestimate the sublimity of Christ's character, but he had no belief in the orthodox theological ideas as to redemption. His views on slavery were far beyond those of his time, but all of his efforts to effect a reform in Virginia were unavailing. The influence that he has had through the Democratic party has been but the most open expression of the deep influence he has had in the democratizing of all American ideas. The unfailing trust which the people of his day put in him was due largely to the deep and steady confidence he had in them.

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JEFFERSON BARRACKS. A United States military reservation and post in Missouri, established in 1826. The reservation, which comprises 1261 acres, is located on the Mississippi, 10 miles below St. Louis. There are a post office, telegraph station, and railroad station at the post, while quarters for 31 officers and 1300 men are provided. Jefferson Barracks was originally a cavalry post equipped with stables. For a number of years it has been known as the Jefferson Barracks Recruit Depot, one of the five large depots at which recruits are received and trained for 36 days before assignment to regiments. It is one of the oldest military posts in the United States, and when it was established St. Louis was merely a trading village. For many years it was the fitting-out rendezvous for important expeditions, and until 1861 hardly a regiment, particularly in the cavalry, could be found which had not at one time been represented in the garrison or made its headquarters at Jefferson Barracks. The St. Louis powder depot and national cemetery are included in the reservation. See DEPOT.

JEFFERSON CITY. The capital of Missouri and county seat of Cole County, near the geographical centre of the State and 125 miles by rail west of St. Louis, on the south bank of the Missouri River, on the Missouri Pacific, the Chicago and Alton, and the Missouri, Kansas, and Texas railroads (Map: Missouri, D 3). Its elevation is more than 600 feet. Among the more notable structures are the Capitol (erected at a cost of $3,500,000), State penitentiary, State armory, Governor's mansion, Supreme Court building, United States courthouse and post office, the county courthouse, Carnegie library, St. Mary's Hospital, and Lincoln Institute (a normal school for the higher education of negroes). The city has also the State and Supreme Court libraries. A fine steel bridge crosses the Missouri River at this point. Jefferson City has valuable natural advantages as the centre of a fertile agricultural and rich mineral region. Coal and zinc abound in the vicinity. It manufactures agricultural implements, boots and shoes, saddletrees, clothing, binding, twine, flour, beer, brooms, foundry products, bricks, etc. There are also railroad shops and roundhouses of the Missouri Pacific. Settled in 1826, Jefferson City was incorporated first in 1839. Under a general legislative act, approved 1893, governing cities of the third class, the government is administered by a mayor, elected biennially, who has important appointive powers, and a unicameral council. Pop., 1900, 9664; 1910, 11,850; 1914 (U. S. est.), 12,780.

JEFFERSON RIVER. One of the three rivers which unite to form the Missouri River. It is formed by the junction of the Beaver Head and Big Hole rivers, in the southwestern part of Montana, flows in a northeasterly direction, and, after a course of 150 miles, unites with the Madison and Gallatin.

JEFFERSONVILLE. A city and the county seat of Clark Co., Ind., on the Ohio River, opposite Louisville, Ky., with which it is connected by two railroad bridges, and on the Pittsburgh, Cincinnati, Chicago, and St. Louis, the Louisville and Northern, the Baltimore and Ohio Southwestern, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads (Map: Indiana, F 8). It is situated at the head of the Ohio Falls, which afford good water power; has a United States quartermaster's supply depot, the Indiana Reformatory, an orphans' home, and city and State Reformatory libraries. A considerable amount of strawberries is shipped from here, and there are extensive manufactures of river steamboats and freight and passenger cars, cement, and numerous other industries of less importance. The government is administered, as provided under the Indiana laws, by a mayor, elected quadrennially, and a council, which elects subordinate officials, excepting police commissioners, who are appointed by the mayor. Pop., 1900, 10,774; 1910, 10,412.

JEFFERY, jĕf′ĕr-ĭ, Edward Turner (1843–). An American railroad president. He was born at Liverpool, England, and came to the United States in 1850. Entering the employment of the Illinois Central Railroad Company in 1856, he was its superintendent in 1877–85 and general manager in 1885–89. He visited the Paris Exposition to make a report on it for the citizens of Chicago in 1889, and then served as chairman of the building and grounds committee of the Columbian Exposition until 1891. He was president from 1891 to 1912, and thereafter chairman of the board directors, of the Denver and Rio Grande Railroad Company; was receiver in 1893–95, and thereafter president, of the Rio Grande Southern; became chairman of the board of directors of the Western Pacific in 1905; and held also the presidency of the New Orleans and Northwestern and the Rio Grande Junction railways and the Utah Fuel Company and directorships in many other corporations.

JEFFREY, jĕf′rĭ, Edward Charles (1866–). An American botanist. He was born at St. Catharines, Ontario, Canada; graduated from the Collegiate Institute of that place in 1879 and from the University of Toronto in 1888; and studied at Harvard University (Ph.D., 1898), where he was assistant professor of vegetable histology and general morphology from 1902 to 1907 and thereafter professor of plant morphology. His researches deal particularly with the evolution of fossil plants, the anatomy of plants and the structure of coal and lignites, and the morphology of vascular plants.

JEFFREY, Francis, Lord (1773–1850). A Scottish critic and lawyer, born in Edinburgh, Oct. 23, 1773. He was educated at the Edinburgh high school, the universities of Glasgow and Edinburgh, and at Queen's College, Oxford; and he studied law in Edinburgh. During this early period he read widely and practiced both verse and prose writing. In 1794 he was called to the bar. Two years before this he became a member of the Speculative Society (in connection with the University of Edinburgh). Jeffrey soon became prominent among the members by the keenness and liveliness of his intellect and the eloquence of his style, but his progress at the bar was slow, partly on account of the antipathy which then existed to literary lawyers and partly on account of his political opinions, which were Whig. Meanwhile he and several other young men then in Edinburgh, ambitious of finding a wider outlet for their talent than the discussion in the Speculative Society or the practice of the bar afforded, planned a critical journal. The first proposer of the scheme was Sydney Smith. The result was the establishment (1802) of the *Edinburgh Review* (q.v.), of which Jeffrey soon became editor, an office he retained till 1829. In politics the *Review* was Whig. Jeffrey, however, confined himself mostly to literary reviews, in which he criticized with great severity the new school of poetry, represented by Coleridge, Wordsworth, Byron, and Shelley. This criticism is now generally discredited; it was perverse and hard, but, nevertheless, shrewd and brilliant. After some years Jeffrey's practice at the bar began to increase; in jury trials he shone to great advantage, particularly in the trials for sedition between 1817 and 1820. In 1830 he became Lord Advocate for Scotland, and after the passing of the Reform Bill he was returned to Parliament for the city of Edinburgh, which he continued to represent till 1834, when he gladly retired to accept a judgeship in the Court of Sessions. During the latter years of his life Jeffrey resided at Craigcrook Castle, near Edinburgh, where he died Jan. 26, 1850. He was twice married, his second wife being Charlotte Wilkes of New York. Accessible volumes of selections are *Essays: English Poets and Poetry* (1905) and *Literary Criticism* (1910), edited by D. Nicol Smith. Consult: H. T. Cockburn, *The Life of Lord Jeffrey* (Edinburgh, 1852; reissue, 1872); Thomas Carlyle, *Reminiscences*, vol. ii (London, 1881); John Morley, "Memorials of a Man of Letters," in his *Studies in Literature* (ib., 1897); L. E. Gates, *Three Studies in Literature* (New York, 1899); H. H. Joline, *A Famous Reviewer* (ib., 1910).

JEFFREYS, jĕf′rĭz, George, Lord (1648–89). An English judge, born at Acton in Denbighshire, Wales. Though the son of a squire of small means, Jeffreys obtained a fair education at Shrewsbury, at St. Paul's, and at Westminster under Dr. Busby; in 1662 he matriculated at Trinity College, Cambridge, which he left the following year without a degree to enter the Inner Temple, London. Admitted to the bar in 1668, with small legal learning, but with a powerful voice and bold address, he soon gained a large practice. About 1672 he deserted his popular constituency and began to cultivate the court party. His ability, zeal, wit, eloquence, and capacity for making friends among unscrupulous attorneys won him rapid advancement, and he became Chief Justice of Chester in 1680, a baronet in 1681, and Chief Justice of England in 1683. He was foremost in the prosecutions of Archbishop Plunket and Stephen Colledge and aided in destroying popular government in London, pushing on the quo warranto proceedings which deprived London of its charter. Charles II, who despised him, consented to his appointment as Chief Justice, swore him as a Privy Councilor in 1683, and connived at and took advantage of his unscrupulousness. Jeffreys was unfair in his rulings in the trial of Algernon Sidney. He condemned Sir Thomas Armstrong without a trial and sent him to his death loaded with insults. He advised James II to collect the customs revenue and use it without a vote of Parliament. His career seemed to culminate in 1685, when he browbeat Titus Oates at his trial. He was created Baron Jeffreys of Wem and was the virtual ruler of London and disburser of all legal patronage. In this year also he traveled the western circuit, his Bloody Assizes condemning hundreds to death, without even the semblance of a fair trial, for their complicity in the insurrection headed by the Duke of Monmouth, among them Alice, Lady Lisle; he assigned over 800 persons to his favorites to be sold as slaves, and imprisoned and maimed hundreds more; yet James II made him Lord Chancellor and Keeper of the Great Seal. He joined with James (if, indeed, he did not advise it) in the arrest and imprisonment of the seven bishops. Frightened at length, in 1688 he attempted to undo some of his autocratic deeds, but the movement came too late. His master James II fled, and he disguised himself in the dress of a common sailor, but was recognized in spite of his disguise and taken to the Tower, where he died April 18, 1689, of a malady from which he had long suffered. In private conversation after his fall he alleged that he lost the favor of James because he would not be still more vindictive in his bloody circuit. Occasionally he did an act that indicated some recognition of the principles of human kindness. In criminal cases he has had, perhaps, no equal among judges for baseness. In civil cases, on the contrary, he is said to have been able and upright and surpassed by few men in the clearness of some of his opinions.

Bibliography. The most complete account of his life is found in Woolrych, *Memoirs of the Life of Judge Jeffreys* (London, 1827). Consult also: North, *Life of Lord Keeper Guilford* (ib., 1826); Roscoe, *Lives of Eminent British Lawyers* (ib., 1830); Burnet, *History of my own Time* (ib., 1838); Roberts, *The Life, Progresses, and Rebellion of James, Duke of Monmouth* (ib., 1844); *Reports of State Trials;* Lord Campbell, *Lives of the Lord Chancellors*, vol. iv (ib., 1849–57); Bent, *The Bloody Assizes* (Edinburgh, 1890); Irving, *Life of Judge Jeffreys* (London, 1898); T. B. Macaulay, *History of England*, vols. i, ii (New York, 1899).

JEFFRIES, jĕf′rĭz, John (1744–1819). An American physician, born in Boston. He graduated at Harvard in 1773, afterward traveled in Europe, and attended classes at the medical colleges in London and Aberdeen. Returning to America, he practiced in Boston until the city was evacuated by the British, when he accompanied the English troops to Halifax. He distinguished himself as an army surgeon, and in 1779 was appointed surgeon major of the British forces in America. He was greatly interested in scientific experiments, more especially in the construction of balloons, with a view to atmospheric experiments, and accompanied François Blanchard in his balloon trip from Dover across the Channel, on which occasion the aëronauts landed in the midst of the Forest of Guienne in France. In 1789 he returned to Boston, where he continued the practice of his profession until his death. A lecture delivered by him in 1789 is said to have been the first public lecture on anatomy given in New England.

JEHAN, Shah. See Shah Jehan.

JEHO′AHAZ (Heb. *Yehō̆'āhāz*, or *Yō̆'āḥāz*, Yahwe holds fast). 1. King of Israel 814–797 B.C. He succeeded his father, Jehu, and in the eyes of the compiler of the Book of Kings was a wicked and inefficient ruler. During his reign the power of Israel was brought very low by the Aramæans of Damascus (2 Kings xiii. 1–9). The "saviour" mentioned in verse 5 has been thought by some to be Adadnirari III of Assyria. 2. King of Judah 608 B.C. He succeeded his father, Josiah, and reigned three months. He was captured at Riblah on the Orontes by Pharaoh Necho, sent to Egypt, and died there (2 Kings xxiii. 31–34). In Jeremiah (xxii. 11) he is called Shallum.

JEHO′ASH (pseudonym of Solomon Bloomgarden) (1870–). A talented Yiddish poet, born at Verzhbolovo, Province of Suwalki. Beginning to write at an early age, he first attracted attention by his poems, some of which were included in the *Jüdische Bibliothek.* In 1890 he emigrated to the United States, 10 years later becoming a regular contributor to *Die Zukunft*, a Yiddish periodical. His fame in America dates from 1907, when the first volume of his poems appeared. Since then 10 volumes of his writings have been published, including four volumes of translations. In 1911 appeared 1 volume of fables, some prose works, and the *Dictionary of Hebrew Elements in Yiddish*, edited by him and C. J. Spivak.

JEHOASH. See Joash.

JEHOL, zhā′hōl (Chin. *Jê-ho*, hot river). A large and important city of Inner Mongolia, situated in a finely wooded region north of the Great Wall, near the borders of Manchuria and 140 miles northeast of Peking, with which it is connected by a good road. The town is mostly inhabited by Chinese immigrants from Shansi and Shantung. Population, exclusive of numerous Lamaistic monasteries, about 25,000. It is a trading town and is noted for its inlaid tables and boxes. There are here an Imperial hunting park and a summer palace called in Chinese Pi-shu-shan-chwang (mountain lodge for avoiding the heat). The latter was built in 1703 on the model of the Yuen-ming-yuen, or summer palace near Peking, destroyed by the Anglo-French forces in 1860. In a beautiful valley in the vicinity are several large Lama monasteries, the chief of which are the Potala and the Teshilumbo. Jehol was the refuge of the Imperial court in 1860, when the French and English occupied Peking, and in 1912, when the last Manchu Emperor abdicated. Consult: Edkins, in the *Journal of the North China Branch of the Royal Asiatic Society* (Shanghai, 1865); Williamson, *Journeys in North China, Manchuria, and Mongolia* (2 vols., London, 1870); *Journal of the Royal Geographical Society* (ib., 1874); R. O. Franke, *Beschreibung des Jehol-Gebietes in der Provinz Chihli: Detail Studien in chinesischer Landes- und Volkskunde* (Leipzig, 1902).

JEHOSH′APHAT (Heb. *Yehōshāphāṭ*, Yahwe judges). The fourth King of Judah (877–848 B.C.). He succeeded his father, Asa, and reigned 25 years. The compiler of the Book of Kings commends him for his piety (1 Kings xxii. 43), and the Chronicler enlarges upon this notice and exalts Jehoshaphat's measures for the defense of his kingdom and his success in war (2 Chron. xvii–xx). During a large part of his reign he was practically a vassal to the kings of Israel, for his visit to Ahab, and his campaigns with the latter (1 Kings xxii. 3–40) and Jehoram (2 Kings iii. 7–27), as well as his going into battle dressed in his full robes, while Ahab went in disguise (1 Kings xxii. 30), were probably enforced by the northern rulers. Jehoshaphat tried to establish communication with the gold country Ophir, but failed, his ships being destroyed by a storm (1 Kings xxii. 48). He was succeeded by his son Jehoram.

JEHOSHAPHAT, Valley of. A valley which the prophet Joel (iii. 2–12) foretells is to be the scene of the judgment of the heathen after the return of Judah and Israel from captivity. No such valley is mentioned elsewhere in the Bible, and it is doubtful whether the writer had any particular site in mind. It has been thought, however, by some scholars that the prophet referred to the valley of Berachah, in which King Jehoshaphat of Judah is said to have gained a notable victory over the Ammonites, Moabites, and Edomites (2 Chron. xx. 26). Another and more popular view identifies the valley of Jehoshaphat with that commonly called Kidron in the Bible—the deep ravine which separates Jerusalem from the Mount of Olives. This view, which can be traced back to the fourth century, has been adopted by travelers of all ages and faiths. It is noticeable that in a Midrashic work the statement is found, "A valley called Jehoshaphat does not exist." Consult Neubauer, *La géographie du Talmud* (Paris, 1868). See Kidron.

JEHO'VAH. A word used in the Authorized Version of the English Bible as the name of the national deity of the Jews in the designation of certain shrines such as Jehovah-jireh (Gen. xxii. 14), Jehovah-nissi (Ex. xvii. 15), and Jehovah-shalom (Judg. vi. 24). It had already appeared in Tyndale's translation of the Pentateuch (1530) in Ex. vi. 3 under the form Iehouah, and in various other Protestant versions. The Hebrew word in these passages, which occurs in the Bible 5410 times, is generally rendered "the Lord" in the English translations. It was expressed in writing, as was the custom among the Jews in earlier times, without any signs indicating the vowels, simply by four consonants corresponding to our Y H W H—the tetragrammaton, as it has been called. When vowel signs were added to the consonantal text of the Hebrew Bible, in the eighth century A.D., as a means of preserving the traditional pronunciation of the sacred literature, those of Adonai (my lord) were attached to the tetragrammaton as an indication that the name was to be pronounced as though it were Adonai (q.v.), or those of Elohim (God) were attached if an Adonai preceded it; but the Masorites did not intend that it should ever be pronounced either Yehowah or Yehowih. By a misunderstanding mediæval Christian scholars combined the vowels of Adonai with the consonantal frame, thus producing the form Jehova, Iehovah. It is commonly stated that this error was unknown until 1520, or, by those who know when Galatinus published his *De Arcanis Catholicæ Veritatis*, until 1518. Moore, however, has called attention to the testimony of Voisin, the editor of the *Pugio Fidei*, of Raymundus Martini, in 1651, that he found the name Jehova in three manuscripts of this work, one of them written in 1381. While doubting that Raymundus himself wrote the name in 1278, as was maintained by Voisin, he concludes that it must have been familiar to copyists of the *Pugio* in the fourteenth century.

While the hybrid form thus goes back to the error of some Christian scribe in the Middle Ages, the Masoretic direction to pronounce the tetragrammaton Adonai must have been a very old tradition at the time when the vowel signs were invented, for the custom had already been introduced when the Greek version of the Law was made in the third century B.C. What led to this practice of substituting Adonai (and hence *Kyrios*, *Dominus*, the Lord) is not known with certainty, but various reasons have been suggested, such as the easier and more general observance of the Third Commandment, if the holy name was not pronounced, or the feeling that the genuine personal name of the deity was too sacred and too powerful to be used except on extraordinary occasions and by any one but the high priest, or the preference for a term that should not bring to mind the old tribal deity after a more transcendental conception had been gained. Adonai was probably chosen in the vast majority of cases because it had often been employed in direct address to the deity, had not seldom been connected with the proper name, and as an appellative was translucent, dignified, and appropriate.

The avoidance of the use of the original name led to the gradual loss of the true pronunciation, though the repeated interdictions against uttering it render it probable that it was still known among the Jews as late as the tenth century A.D. The Samaritans seem to have continued longer than the Jews to pronounce the holy name. Theodoret (*Questio xv in Exodum*) declares that they pronounced it Ιαβε, i.e., Yave; and though *shema* (the Name) has been substituted for it, there is unimpeachable evidence that even the Samaritans of to-day know that Yahwe was the original pronunciation. Pagan magicians, Gnostics, and Christians learned what the name was; hence the Ethiopic Yawe, and the forms Ιαβα (pronounced Yava) and Ιαωουηε (Iaoue) in magical papyri. Yahwe was seen to have been the true pronunciation of the tetragrammaton by Génébrard (in 1567) and others, before it was recognized again by Gesenius and Ewald, as has been shown by Moore. The name goes back at least to the middle of the ninth century B.C., as it is found in the Mesha inscription, and it is, after all, most probable that the Moabitish King pronounced it Yahwe, and not Yaho(h), or Yahwah. As to the meaning of Yahwe, Ex. iii. 14 clearly connects it with the root *haya*, 'to be,' 'to become,' and the phrase has generally been understood to mean 'I am what I am'; but Paul Haupt has recently suggested that it might be read *ahye asher yihye*, 'I call into existence what comes into existence' (*Studien. Wellhausen gewidmet*, p. 211, Giessen, 1914). Wellhausen explains it from a root *hawa*, 'he goes through the air' (*Israelitische und jüdische Geschichte*, p. 23, 7th ed., 1914). Others think of a root suggesting 'he sends down, i.e., lightnings.' The presumption is in favor of the etymology suggested by Ex. iii. 14, 'the Maker.'

But another form of the name than the tetragrammaton once existed. The Jews on Elephantine in the fifth century B.C. wrote the name YHW, but also YHH, which seems to indicate that the pronunciation was either always Yaho, or sometimes Yaho, sometimes Yahu. This Yaho was rendered into Greek Ιαω (Iao), and frequently found in Greek papyri and among later writers; the *h*, or *spiritus asper*, was generally elided, but in a demotic papyrus (Leyden A 65) the aspirate *h* is still shown, and in the corresponding Greek text its place is taken by an epsilon. Yaho is found frequently in the ophorous names shortened to Yeho or Yo, both in the Hebrew Bible and in inscriptions recently discovered at Samaria and at Jericho. Yaho or Yahu also underlies the rendering of Hebrew names in Assyrian. Of this form Yah, found in the phrase *Hallelu Yah* (Praise ye Yah!) and also independently, is no doubt an abbreviation, as is seen in the case of names like Yeshayahu (later Yeshayah), Yirmyahu (later Yirmyah). It is not so easy to decide whether Yahu or Yaho is a shortened form of Yahwe, this a lengthened form of Yahu, or whether both are independent. The analogy of Asur, Asir, Asher, Ashur, and even Anshar (see ASSUR) suggests that the form may have varied in different localities and ages, that Yahwe may be due to a desire to find a meaning in what was not a translucent name, and that there may have been a welding together into one of two entirely distinct divinities. It is possible that the name Yahwe, as well as the etymology of it that suggests a creator, is due to the Levites, whose teachings spread from Kadesh Barnea through the Negeb and Judah to Israel; that a god Yahu was widely worshiped in Syria in earlier days, as it is certain that in the Hammurapi period and in the time of the Kassites Yau was worshiped in Babylonia; and that in course of time the distinction between them was obscured. Concerning the meaning of Yahu nothing is known. It has been held that Yahwe was taken over by Moses from Jethro and his people, the Midianites. But there is nothing in Ex. xviii that forces us to conclude either that Moses had been converted to the god of Jethro or Jethro to the god of Moses. (See MOSES; PENTATEUCH.) Consult: Driver, "The Tetragrammaton," in *Studia Biblica* (Oxford, 1885); Smend, *Alttestamentliche Religionsgeschichte* (Freiburg, 1893); Dalman, *Der Gottesname Adonai* (Leipzig, 1896); G. F. Moore, in *Old Testament and Semitic Studies* (Chicago, 1908); Clay, *Amurru* (Philadelphia, 1909); Sellin, in *Mitteilungen der deutschen Orientgesellschaft*, No. 41 (Berlin, 1909); Lyon, in *Harvard Theological Review* (Cambridge, 1909); Grimme, in *Orientalische Literaturzeitung* (Leipzig, 1912); Leander (ib., 1912); König (ib., 1913); Schmidt, in *Journal of Biblical Literature* (Boston, 1915).

JEHOVIST, jē-hō'vĭst. See ELOHIST AND YAHWIST.

JE'HU (Heb. *Yēhū*, perhaps from *Yehō-hū*, Yahwe is he). Tenth King of Israel (c.842–815 B.C.), son of Jehoshaphat and grandson of Nimshi. From the position of one of the body guards of Ahab he rose to that of general under Joram. He seized the opportunity of Joram's absence in Jezreel, whither he had gone to seek healing from his wounds received in the battle with the Aramæans of Damascus, to seat himself on the throne. Having control of the army intrusted to him for the protection of the border city Ramoth-Gilead against the Aramæans, Jehu proceeded against his royal master, slew Joram and also Ahaziah, King of Judah, who was on a visit to the King of Israel. He also had Jezebel, the wife of Ahab, put to death and, not content with this, brought about a wholesale massacre of Ahab's (or Joram's) family and also of 42 kinsmen of Ahaziah. This story of Jehu's conspiracy is told (2 Kings ix–x) in connection with the narrative of the prophet Elijah. Jehu's deeds are portrayed as retribution for the judicial murder of Naboth (1 Kings xxi), and he is represented as the instrument of Yahwe to bring about the destruction of Ahab. Such an interpretation, of course, reflects the later religious point of view; but it would seem that Jehu indeed posed as the devotee of Yahwe, for he follows up his destruction of the house of Ahab by an extermination of the prophets and priests of Baal. By a cunning stratagem he collects them together in the temple court and puts them to death (2 Kings x. 18–28). Whatever his motives may have been, he does not appear in the light of a religious reformer to the later Old Testament writers, who cannot disguise the fact that Jehu was not a Yahwe worshiper according to their ideals. In fact, he maintained the "high places" with the Canaanitish rites and associations, and the triumph of Yahwe simply meant for Jehu an absorption of Baal's rôle by the Hebrew deity. The political activity of Jehu was mainly directed towards the subjugation of Judah, which under Ahab had practically become a vassal of Israel. (See JEHOSHAPHAT.) At the close of his reign, however, Judah was in a somewhat more favorable position than at the beginning. In 842 B.C., shortly after mounting the throne, Jehu purchased the favor of Shalmaneser III of Assyria (860–825 B.C.) by rich gifts. The Assyrian king laid siege to Damascus, and on his return from his campaigns erected a monument in Nineveh (the so-called black obelisk of Shalmaneser III, now in the British Museum), on which, among other events, he depicted this tribute of Jehu. The latter, however, gained little by currying favor with Assyria. Damascus again began to stir itself and assumed the offensive against Israel, and before the end of Jehu's reign his kingdom was weakened on various sides, though he was able to hand over the succession to his son Jehoahaz (q.v.).

JEHU. A popular term for a driver, especially for one who drives rapidly, derived from Jehu, the son of Nimshi, mentioned in 2 Kings ix. 20.

JEHU'DA, BEN SAMUEL. See JUDAH, BEN SAMUEL.

JEJU'NUM (Neo-Lat., from Lat. *jejunus*, empty). The middle portion of the small intestine, situated between the duodenum and the ileum and forming about one-third of the length of this portion of the intestinal tract. It derives its name from the fact that in post-mortem examinations it is almost always found empty. The jejunum is wider, more vascular, and of a deeper color than the ileum; its walls are also much thicker, but there is no sharp line of division between the two portions. The surface for absorption is much increased by folds of the mucous membrane and the submucous tissue, the valvulæ conniventes, which are also present in the upper half of the ileum.

JE'KYLL, DR. See STRANGE CASE OF DR. JEKYLL AND MR. HYDE.

JELALABAD, je-lä'lȧ-bäd', or **JALALABAD.** A town of Afghanistan, 96 miles east of Kabul, on the Kabul River, near the Khyber Pass (Map: Afghanistan, O 5). Its defenses were destroyed at the British evacuation of Afghanistan in 1842. The town occupies a very strong natural position, is of great strategic importance as controlling the entrance to north India through the Khyber Pass, and is the winter residence of the Ameer of Afghanistan. Pop. (est.), 4000. The place was heroically defended by Sir Robert Sale against the Afghans in 1842.

JELF, William Edward (1811–75). An English divine and classical scholar, son of Sir James Jelf, of Gloucestershire, and brother of Dr. Richard William Jelf. He was born at Gloucester and was educated at Eton and Christ Church, Oxford. From 1846 to 1848 he was one of the Whitehall preachers, and in 1857 gave the Bampton lectures before the university. His most important publication was his *Grammar of the Greek Language,* chiefly from the German of Raphael Kühner (2 vols., Oxford, 1842–45; 4th ed., 1866), which was considered a marked improvement on all earlier Greek grammars in the English language.

JELINEK, yĕl'ĭ-nĕk, Carl (1822–76). An Austrian meteorologist, born at Brünn in Moravia. He was educated in Vienna and in 1843 became assistant in the Vienna Observatory. In 1847 he went to the Prague Observatory, where he was associated with Kreil in researches on terrestrial magnetism and meteorology. From 1852 to 1863 he was professor of mathematics in the Prague Polytechnic and then returned to Vienna as director of the Central Meteorological Institute. He was prominent in the meteorological congress at Leipzig in 1872. With Hann he edited the journal of the Austrian Meteorological Society, of which he was a founder. He took a prominent part in the reform of Austrian technical education and published *Anleitung zur Anstellung meteorologischer Beobachtungen* (1869; 4th ed., 1893–95) and *Psychrometertafeln* (5th ed., enlarged by Pernter, 1904).

JELLACHICH DE BUZIM, yĕl'là-chĕch de bōō'tsêm, Joseph, Count (1801–59). Ban of Croatia. He was born at Peterwardein in Slavonia, Oct. 16, 1801. His father, the descendant of an old Croatian family, was a general in the Austrian service and attained some distinction in the Turkish and Napoleonic wars. Joseph Jellachich, after several years of service on the Turkish frontier, in which he distinguished himself by his courage and skill, became colonel of the first border regiment of Croatia. In 1848 he was appointed by the Emperor Ferdinand general and Ban or Governor of Croatia, and as such he headed the movement of the Southern Slavs of Hungary against Magyar domination. He was urged on in this course by the court of Vienna, which saw in him a convenient instrument for checking the progress of the revolution in Hungary. In September, 1848, Jellachich invaded Hungary with a powerful army and advanced upon Budapest. He was repulsed at Pákozd (September 29), but effected a junction with Windischgrätz before Vienna and defeated Perczel at Moor (December 29). He suffered a disastrous defeat at Kis-Hegyes, and after the termination of the revolutionary struggle returned to Agram as Ban. He was made a count in 1855 and died at Agram, May 20, 1859. He published a volume of poems, among them military songs which became popular.

JELLICOE, jĕl'ĭ-kō, Sir John Rushworth (1859–). An English naval officer. Educated at Rottingdean, he entered the navy in 1872; served in the bombardment of Alexandria and in the battle of Tel el-Kebir in 1882; in 1893 as commander was wrecked on the *Victoria;* and in 1898–1901 was in China, where he commanded the naval brigade and was chief of staff to Admiral Seymour in the relief of the Peking legations, being terribly wounded in the lungs. He was director of naval ordnance from 1905 to 1907, then was promoted rear admiral, and in 1908–10 was Lord Commissioner of the Admiralty and Controller of the Navy. He commanded the Atlantic fleet in 1910–11 and the second squadron home fleet in 1911–12, and in December, 1912, became Second Sea Lord of the Admiralty. When war broke out in 1914, he commanded the home fleet. See War in Europe.

JELLIFFE, jĕl'ĭf, Smith Ely (1866–). An American neurologist, born in New York City. After graduating from the Brooklyn Polytechnic Institute in 1886 and from the College of Physicians and Surgeons (Columbia) in 1889, he studied also in Europe. He was professor of pharmacognosy and technical microscopy at the College of Pharmacy (Columbia) (1897–1907) and instructor in materia medica and therapeutics (1903–07) at the College of Physicians and Surgeons (Columbia), clinical professor of mental diseases at Fordham University (1907–12), and adjunct professor of diseases of the mind and nervous system at the New York Post-Graduate Hospital and Medical School after 1911. From 1905 to 1909 he was associate editor of the *New York Medical Journal;* after 1902 managing editor of the *Journal of Nervous and Mental Disease;* editor of the *Medical News* (New York) in 1900–05 and of the *Nervous and Mental Monograph Series* after 1907; and coeditor with Dr. W. A. White of the *Psychoanalytic Review* in 1913. Besides translating and editing many foreign texts he edited, with White, *Modern Treatment of Nervous and Mental Diseases* (2 vols., 1913); revised Butler's *Materia Medica* (1902) and *Shaw on Nervous Diseases* (1903); and is author of *Outlines of Pharmacognosy* (1904).

JELLINEK, yĕl'lĭ-nĕk, Adolf (1821–93). An Austrian Jewish theologian, born in Moravia, and educated at Prague and Leipzig. He was a rabbi in Leipzig and, after 1857, in Vienna, where he founded a school for the study of the Talmud. A famous preacher, he published, besides 200 sermons: *Sefat Chachamhim,* explaining Persian and Arabic words in the Talmud (1846–47); *Beiträge zur Geschichte der Kabbala* (1851–52); *Auswahl kabbalistischer Mystik* (1852); *Thomas von Aquino in der jüdischen Litteratur* (1853); *Philosophie und Kabbala* (1854); *Der jüdische Stamm* (1869); *Der jüdische Stamm in nicht-jüdischen Sprichwörtern* (1881–85); and, in Hebrew, a collection of essays, *Kontresim* (1877–84).

JELLINEK, Georg (1851–1911). A German jurist, son of Adolf Jellinek. He was born at Leipzig and was educated there, at Vienna, and at Heidelberg. Leaving the employ of the Austrian government in 1879, he became a member of the legal faculty at Vienna, then at Basel (1889), and in 1891 at Heidelberg. Among his works are: *Die socialethische Bedeutung von Recht, Unrecht und Strafe* (1878; 2d ed., 1908); *Die Lehre von den Staatenverbindungen* (1882); *Oesterreich-Ungarn und Rumänien in der Donaufrage* (1884); *System der subjektiven öffentlichen Rechte* (1892; 2d ed., 1905); *Adam in der Staatslehre* (1893); *Das Recht der Minoritäten* (1898); *Das Recht des modernen Staates* (1900; 2d ed., 1905); *Verfassungsänderung und Verfassungswandlung* (1906); *Der Kampf des alten mit dem neuen Recht* (1907).

JEL'LYBY, Mrs. A sham philanthropist in Dickens's *Bleak House.*

JEL'LYFISH'. The popular name for any of the free-swimming medusoid or ctenophoran cœlenterata (q.v.). The name is obviously applicable because of the transparent gelatinous material which makes up the bulk of the body. In a stricter sense the name is applied only to the larger medusæ, such as those of the genera *Aurelia*, *Cyanea*, etc., which are frequently cast up on seabeaches. Under such circumstances the external form and beauty are generally obliterated, and the animal is literally only a mass of jelly. This has the general form of a saucer or concave disk, whence the name Discophora has been applied to the group—from the underside of which hang the pendent feeding and reproductive organs. Consult: Alexander Agassiz, "North American Acalephæ" (containing an extensive bibliography), in *Memoir of the Museum of Comparative Zoölogy*, vol. i (Cambridge, 1865); G. J. Romanes, *Jelly-fish, Star-fish, and Sea-urchins: Being a Research on Primitive Nervous Systems* (New York, 1885); Agassiz and Mayer, "Acalephs from the Fiji Islands," in *Bulletin of the Museum of Comparative Zoölogy*, vol. xxxii (Cambridge, 1899); A. G. Mayer, *The Medusae of the World* (Washington, 1911). See Ctenophora; Medusa Siphonophora; and Colored Plate of Medusæ and Siphonophora.

JEMAPPES, zhẽ-mȧp′. A manufacturing town in the Province of Hainault, Belgium, on the Haine, 5 miles southwest of Mons (Map: Belgium, B 4). It has an industrial school, coal mines, iron, glass, and porcelain factories. It is celebrated for the victory won here by 46,000 French, under Dumouriez and the future King Louis Philippe, over 26,000 Austrians, under the Duke of Saxe-Teschen, Nov. 6, 1792, the former losing 4000 men and the latter 7000. This victory gave the Republic the possession of Belgium. Pop., 1900, 12,778; 1910, 14,270.

JEMEZ, hä′mȧs. A Pueblo village of Tanoan stock, situated on Jemez River, a western affluent of the Rio Grande, about 35 miles westward from Santa Fe, New Mexico. The inhabitants are peaceable and selfsupporting, with fine fields and orchards. Few of the native arts are maintained, but interesting dances are still to be seen. Pop., about 500. See Pueblo; Tanoan Stock.

JENA, yä′nä. A famous university town in the Grand Duchy of Saxe-Weimar-Eisenach, Germany, situated amid precipitous chalk hills on the left bank of the Saale, 10 miles southeast of Weimar (Map: Germany, D 3). It has two fine churches—the fifteenth-century late-Gothic Michael's Church and the high-vaulted collegiate church. The old moats encircling the town have been replaced by fine promenades with monuments of famous scientists. There are in the city many tablets in honor of men who have been associated with the university—Fichte, Schiller, Arndt, Hegel, Reuter, Schelling. Jena also has memories of Luther in the old Black Bear Inn; but the old castle in which Goethe more than once sojourned was torn down in 1905 to make place for a new university building. Jena is the seat of the famous university, with a library of 270,000 volumes. (See Jena, University of.) The educational institutions comprise also a Gymnasium, a number of other secondary schools, and scientific organizations. The chief manufactory is the famous Zeiss Optical Works, where lenses are made from Jena glass. The town also makes bricks, vaseline, pianos, soap, and smoked meats. It does a large book business. The Lichtenhainer beer, made in the vicinity, is famous. Pop., 1900, 20,686; 1910, 38,487, chiefly Protestant. Jena is noted as the scene of a great battle (Oct. 14, 1806), in which about 65,000 Prussians under Prince Hohenlohe were completely defeated by nearly 100,000 French under Napoleon. Little Jena was included in the city limits in 1909.

JENA, University of. A German university which is the outgrowth of a Gymnasium or high school founded by John Frederic, Elector of Saxony, about 1547, as a centre of Protestant teaching. It was authorized by the Emperor Ferdinand I as a university in 1558 and soon became famous. Its most flourishing period was under the patronage of Duke Charles Augustus, from 1787 to 1807. Among the famous names connected with the university are those of Fichte, Schelling, Hegel, and Oken in philosophy, Schiller (who lectured here in history for 10 years), the brothers Schlegel, Voss, Fries, and Krause. The university is associated with the rise of the Burschenschaften in 1815. Much of its distinction in recent times has been in biology, philosophy, and theology, the most noted names connected with these departments being those of Haeckel and Eucken. In theology Jena represents the most liberal tendencies. Through the influence and benefactions of Carl Zeiss the university has developed considerable research in optics. Through its educational courses and its Seminar, or practice school, Jena has exercised great influence on education in England and America. New university buildings were added in 1908. The university had in 1913 some 2187 students. Its budget is about 480,000 marks. The library contains 270,000 volumes, 300,000 dissertations and pamphlets, and 1000 volumes of manuscripts. The influential *Litteraturzeitung für Deutschland* (1785–1874) was issued from Jena for nearly a century. Consult A. Stier, "Jena," in *Die deutschen Hochschulen, Illustrierte Monographien* (Berlin, 1908).

JENATSCH, yä′nȧtch, Georg, or Jürg (1596–1639). A Swiss soldier and leader in the party strifes of Switzerland during the period of the Thirty Years' War. He was born at Samaden, studied theology at Zurich, and became a Protestant pastor at Veltlin and leader of the Protestants in Grisons. In 1618 he outlawed the Plantas, leaders of the Spanish and Catholic sympathizers, and so put himself for a time at the head of the Patriotic party. Three years later he killed one of these leaders and had to flee. After the entry of the Austrians he was forced to leave Grisons and served under Mansfeld and under the Duke de Rohan. When Rohan did not fulfill the wishes of the Patriotic party (restoration of the Valtellina to the Grisons), Jenatsch turned Catholic and entered the Austrian and later the Spanish service. He was murdered at a banquet by Planta's followers. Jenatsch is portrayed in K. F. Meyer's historical novel *Georg Jenatsch* (Davos, 1894) and by Dierauer (Saint-Gall, 1896).

JENCKES, jĕṇks, Joseph (1656–1740). A Colonial Governor of Rhode Island, born at Pawtucket. He was a surveyor and acted for Rhode Island in the settlement of the Massachusetts boundary and later served Massachusetts in her disputes with Maine and New Hampshire. In 1721 he went to England to bring the boundary question before the King. After many years in the Legislature and 10 years' service as Deputy Governor, he was elected Governor

(1727). In this capacity he vetoed (in 1731) an act authorizing the issue of paper money. He refused reëlection in 1732. According to story, Jenckes was 7 feet, 2 inches tall and of symmetrical figure.

JENCKES, Thomas Allen (1818–75). An American legislator and lawyer, born at Cumberland, R. I. Graduating at Brown University in 1838, he was admitted to the bar in 1840. He was government counsel in the suits against the Crédit Mobilier and was engaged in patent cases, especially those on the Sickles and Corliss steam engine and the rubber patents of Day and Goodyear. He was intimately connected with the State government during Dorr's Rebellion (1842); became Secretary of the Governor's Council; served in both bodies of the State Legislature; and practically unaided carried his point (Peckham *v.* Burrows) that the Legislature could order a new trial. He was elected to Congress by the Republican party in 1862 and served until 1871. He introduced the general bankrupt law of 1867, as well as important bills for the revision of copyright and patent statutes. His name is especially identified with efforts for the reform of the civil service. In 1868 he prepared an elaborate report on the civil service of other countries, and by speeches and reports he promoted the passage of the law which lies at the basis of the reform. Consult *First Report of the United States Civil-Service Commission* (Washington, 1884).

JENGHIS KHAN, jĕn′gĭz kän. See Genghis Khan.

JEN′KIN, Henrietta Camilla (Jackson) (c.1807–85). An English novelist, born in Jamaica. After marrying Charles Jenkin, a British naval officer, in 1832, she lived in Paris, Genoa, and Edinburgh. Her novels include: *Violet Banks, and its Inmates* (1858); *Cousin Stella* (1859); *Who Breaks, Pays* (1861); *Skirmishing* (1862); *Once and Again* (1865); *Two French Marriages* (1868; reprinted in New York as *A Psyche of To-Day,* 1868); *Madame de Beauprés* (1869); *Within an Ace* (1869); *Jupiter's Daughters* (1874).

JENKIN, Henry Charles Fleeming (1833–85). An English engineer and electrician. He was born at Stowting Court, Kent, England, and, after being instructed at a number of educational institutions, graduated from the University of Genoa as Master of Arts in 1850. While engaged in electrical engineering connected with cable testing and laying, he became acquainted with Sir William Thomson, afterward Lord Kelvin, and later a partnership was established, and many important cables were laid under their direction. In addition to his work in telegraph and cable engineering, Jenkin was also associated with Sir William Thomson and C. F. Varley in the invention and construction of electrical instruments. At Sir William's suggestion he was made a member of the committee appointed by the British Association to consider and determine practical electrical units and prepared a number of important reports on this subject. He also devised the system of telpherage for the transportation of goods from place to place and was interested in questions of mechanical and civil engineering as well as electrical matters. In 1865 he became professor of engineering in University College, London, and in 1868 he accepted a call to a similar chair in the University of Edinburgh, which he held until his death. In 1865 he was elected a fellow of the Royal Society of London, and in 1879 was elected vice president of the Royal Society of Edinburgh, the larger part of his many scientific papers appearing in the *Transactions* and *Proceedings* of these two societies. He was an LL.D. of Glasgow University and was a man of letters and broad information as well as a successful scientist. He was particularly interested in sanitary reform and organized societies for this purpose in Edinburgh and elsewhere. He was the author of a work on *Electricity and Magnetism* (1873). He contributed to the 9th edition of the Encyclopædia Britannica. His *Papers, Literary, Scientific, etc.,* edited by Sidney Colvin and J. A. Ewing, with a memoir by R. L. Stevenson, were published in 1887.

JEN′KINS. A town in Letcher Co., Ky., 139 miles from Ashland, on the Sandy Valley and Elkhorn Railroad. It is situated in a rich bituminous coal field. Jenkins was converted in 1911–12 from a thickly wooded place to a model little mining town by the Consolidation Coal Company. The project involved the expenditure of an enormous sum of money and is considered a most remarkable engineering feat. Pop., 1914 (local est.), 5000.

JENKINS, Charles Jones (1805–83). An American statesman and jurist, born in Beaufort District, S. C., and educated at the University of Georgia and Union College. He was elected to the Legislature of Georgia in 1830, served a short term as Attorney-General, and was in the Georgia House from 1836 to 1850 as leader of his party and as Speaker. Although he was a Democrat, he supported Harrison (1840) and Clay (1844). Jenkins was chairman of the State Convention which, in the platform of 1850, threatened secession; in the same year he refused the portfolio of the Interior. He was State Senator from 1856 to 1860 and judge of the Supreme Court from 1860 to 1865; was elected provisional Governor in 1865, served until 1868; and was president of the Constitutional Convention of 1877. Consult C. C. Jones, *Life and Services of C. J. Jenkins* (Atlanta, Ga., 1884).

JENKINS, Edward Hopkins (1850–). An American agricultural chemist. He was born at Falmouth, Mass.; in 1872 graduated from Yale University (Ph.D., 1879) and studied at the University of Leipzig (1875–76). He served as chemist (1877–1900), vice director (1882–1900), director after 1900, and treasurer after 1901 of the Connecticut Agricultural Experiment Station. From 1897 to 1903 he was chairman of the Connecticut Sewage Commission. In 1913 he served as president of the Association of Agricultural Colleges and Stations. He published *The Small Rock Garden* (1913).

JENKINS (John) Edward (1838–1910). An Anglo-Indian lawyer, politician, and author, born at Bangalore, India. He was educated at McGill University and at the University of Pennsylvania and studied law at Lincoln's Inn, London, where he was admitted barrister in 1864. He acquired a lucrative colonial practice; was counsel for the coolies on the Demerara Coolie Commission in 1870; was agent general for Canada in 1874–76; and was a member of the Royal Commission on Copyright in 1876–77. After an unsuccessful contest as a Liberal candidate for Truro in 1870, he represented Dundee in Parliament in the Liberal interest from 1874 to 1880; but as an Independent Liberal and Imperialist, and later as a Conservative, failed in his canvasses for Edinburgh in 1881 and for Dundee in 1885 and in 1896. For 24 years he edited the *Overland Mail* and the *Homeward Mail.* He was a prolific political and miscellaneous essayist, and as a novelist produced several works, of which *Ginx's Baby, His Birth and Misfortunes* (1870), published anonymously, was his first success. Among his later writings are: *Lord Bantam* (2 vols., 1871); *Barney Geoghegan, M.P., and Home Rule at Saint Stephen's* (1872); *Little Hodge* (1872), which had a great vogue; *The Devil's Chain* (1876); *Lutchmee and Dilloo: A Study of West Indian Life* (3 vols., 1877); *The Captain's Cabin: A Christmas Yarn* (1877); *Janus, or the Double-Faced Ministry* (1877); *Jobson's Enemies* (3 vols., 1879–82); *Lisa Lena* (2 vols., 1880); *A Paladin of Finance* (1882); *A Week of Passion, or the Dilemma of Mr. George Barton the Younger* (3 vols., 1884); *A Secret of Two Lives* (1886); *Pantalas* (1897); *A Fantasy of Faith* (1900).

JENKINS, Sir Leoline (1623–85). An English judge and diplomat, born at Llantrissant, Glamorganshire. He entered Jesus College, Oxford, in 1641, served in the Royalist army during the Civil War, and fled to the Continent in 1655. After the Restoration he was fellow (1660–61) and head (1661–73) of Jesus College. He was appointed registrar of the consistory court of Westminster in 1661, deputy professor of civil law at Oxford in 1662, deputy judge of the court of the arches in 1664, judge of the admiralty court in 1665, Privy Councilor in 1680, and judge of the prerogative court of Canterbury in 1689. He was knighted for diplomatic services in France by Charles II, represented England at the congresses of Cologne (1673) and Nimeguen (1676–79), and served as Secretary of State in 1680–84.

JENKINS, Thornton Alexander (1811–93). An American naval officer. He was born in Virginia and entered the United States navy in 1828 as a midshipman. He spent the greater part of his life in the service and rose to be rear admiral in 1870, retiring from active duties in 1873. He served with the Mediterranean, African, and North and South Atlantic squadrons until 1845, when he was deputed to investigate the lighthouse systems of Europe. Out of this investigation grew the Law of 1852, framed by Jenkins, under which the Lighthouse Board was administered until merged into a bureau of the Department of Commerce in 1910. After serving on the coast of South America and in Central America, and in Mexico during the war with that country, Jenkins was promoted to a captaincy in 1862 and did good service during the Civil War. He had command of one of the monitors at the battle of Mobile Bay and was highly commended in the report of Admiral Farragut. In 1865 he was chief of the Bureau of Navigation; 1869–71, naval secretary of the Lighthouse Board; 1871–73, in command of the East India squadron. In 1876 Jenkins had charge of the exhibit of the United States Navy Department in the Centennial Exhibition at Philadelphia.

JEN'KINSON, Charles and Robert, first and second Earls of Liverpool. See Liverpool.

JENKINS'S EAR, War of. The popular name of the war between Spain and Great Britain in 1739, which was occasioned chiefly by the complaint of Robert Jenkins, an English ship captain, that he had lost an ear and had undergone other tortures at the hands of the Spaniards. This outbreak was swallowed up in the War of the Austrian Succession.

JEN'KINTOWN. A borough in Montgomery Co., Pa., 10 miles north of Philadelphia, on the Philadelphia and Reading Railroad (Map: Pennsylvania, L 7). It is in a fertile agricultural district and has railroad switch works. There is a public library here. Pop., 1900, 2091; 1910, 2968.

JENKS, Arthur Whipple (1863–). An American Protestant Episcopal theologian. He was born at Concord, N. H., and graduated from Dartmouth College in 1884 and from the General Theological Seminary in 1896. He was ordained a deacon in 1892 and a priest in 1893 in the Protestant Episcopal church and was rector of St. Luke's Church at Woodsville, N. H., in 1892–95. He served as professor of ecclesiastical history at Nashotah House, Wis. (1895–1901), at Trinity College, Toronto, Canada (1901–10), and at the General Theological Seminary after 1910. He received the degree of D.D. from Dartmouth in 1911. He published *Notes for Meditation on the Beatitudes of the Psalter* (1914) and was a contributor to the New International Encyclopædia.

JENKS, Edward (1861–). An English authority on law, born at Clapham, Surrey. He was educated at Dulwich College and at King's College, Cambridge, of which he was scholar and fellow. For a year (1888–89) he lectured at Pembroke and Jesus colleges, Cambridge, then removing to Australia to be dean of the faculty of law in the University of Melbourne. He returned to England in 1892, was Queen Victoria professor of law in University College, Liverpool (1892–96), reader in English law at Oxford, and tutor and lecturer at Balliol College until 1903, and principal and director of legal studies of the Law Society. In addition he served as examiner in the universities of Oxford, Dublin, Durham, London, and Wales, and for the Civil Service Commission, was made honorary secretary of the Society of Public Teachers of Law, and for some years edited the *Independent Review.* His works include: *Constitutional Experiments of the Commonwealth* (1891); *The Doctrine of Consideration in English Law* (1893); *The Government of Victoria, Australia* (1893); *History of the Australasian Colonies* (1895; 3d ed., rev., 1912); *Outline of English Local Government* (1894; 2d ed., 1907); *Law and Politics in the Middle Ages* (1897); *Modern Land Law* (1899); *A Short History of Politics* (1900; 12th thousand,. 1902); *Edward I* (1902); *Parliamentary England* (1903); an exhaustive *Digest of English Civil Law* (1905 et seq.), with others; *Husband and Wife in the Law* (1909); *Short History of English Law* (1912).

JENKS, Jeremiah Whipple (1856–). An American economist and educator, born at St. Clair, Mich. He graduated at the University of Michigan in 1878, studied for several years in Germany, taking his doctorate at the University of Halle in 1885, and after his return studied law and was admitted to the bar. Previous to his residence abroad, he had taught at Mount Morris College, and in 1886 he returned to educational work as professor of political science and English literature at Knox College. Subsequently he held the chair of political economy and social science at Indiana University (1889–91) and then for 21 years a similar chair at Cornell. In 1912 he was appointed professor of government and director of the division of public affairs in the School of Commerce, Accounts, and Finance, New York University.

Besides his professorial duties he found time to do much as a government expert. In 1899–1901 he was in Europe as agent of the United States Industrial Commission on Investigation of Trusts and Industrial Combinations in the United States and Europe; for a time he was consulting expert on trusts for the Department of Labor; in 1902 he visited Egypt, India, Burma, the Straits Settlements, Java, and the Philippines as special commissioner of the War Department, investigating questions of currency and internal taxation, labor, and police; in 1903 he was employed by the Mexican government as special expert on currency reform; and in 1903–04 he was a member of the United States Commission on International Exchange, in special charge of the reform of the currency of China. He was appointed in 1907 a member of the United States Immigration Commission. He became director of the Far Eastern Bureau, New York, in 1913. His publications include: *Henry C. Carey als Nationalökonom* (1885); an important discussion of *The Trust Problem* (1900; 6th ed., 1912); *Industrial Combinations in Europe* (1901); *Report on Certain Economic Questions in the English and Dutch Colonies in the Orient* (1902); *Citizenship and the Schools* (1906); *The Political and Social Significance of the Life and Teachings of Jesus* (1906); *Life Questions of High School Boys* (1908); *Principles of Politics* (1909); *Governmental Action for Social Welfare* (1910); *The Immigration Problem* (1913), with W. J. Lauck; *The Making of a Nation* (1913), with Prof. C. F. Kent. In addition he was editor and part author of vols. i and xiii of *Trusts and Industrial Combinations* (1900, 1901), the title of the Industrial Commission's reports; and part author and compiler of *Reports of the Commission on International Exchange* (1904, 1905).

JENKS, Joseph (1602–83). An American Colonial inventor, born of Welsh parentage in Hammersmith, London, England. He learned the trade of a founder and machinist, and emigrated to Massachusetts Bay about 1645. In the same year he settled at Lynn, Mass., where a little later he became superintendent of an iron foundry—the first to be established in America. Jenks himself was the first founder in iron and brass of whom there is any record in the Colonies. He had considerable ability as an inventor, and to him, on May 6, 1646, the General Court of Massachusetts granted a patent for "an engine for mills to go by water," the first recorded American patent. Later Jenks was granted patents for scythes, saws, and other edged tools. In 1652 he made the dies for the new Colonial coinage, among the coins struck from his dies being the famous "pine-tree" shilling. In 1654 he contracted with the selectmen of Boston to construct "an engine to carry water in case of fires." Consult Lewis and Newhall, *History of Lynn* (Boston, 1865).

JENKS, Tudor (1857–). An American writer. He was born in Brooklyn, N. Y., graduated from Yale in 1878 and from Columbia Law School in 1880, and after seven years' law practice in New York was from 1887 to 1903 an editor of the *St. Nicholas Magazine*. His numerous and varied books include: *The Boys' Book of Exploration* (1900); *Galopoff, the Talking Pony* (1902); *Capt. John Smith* (1904); *In the Days of Chaucer* (1904); *Capt. Myles Standish* (1905); *In the Days of Milton* (1905); *In the Days of Shakespeare* (1904); *In the Days of Scott* (1906); *In the Days of Goldsmith* (1907); *The Book of Famous Sieges* (1909); *When America Became a Nation* (1910); *What Shall I Be?—A Sailor* (1911).

JENKS, William (1778–1866). A Congregational clergyman. He was born at Newton, Mass., graduated at Harvard in 1797, and served as pastor at Bath, Me., 1805–17. He was also a chaplain in the War of 1812 and professor of Hebrew and English literature at Bowdoin College. In 1826 he went to Boston and there played a prominent part as pastor, philanthropist (especially as the friend of sailors), and scholar. He was one of the founders of the American Oriental Society and of the American Antiquarian Society of Worcester, Mass. He published *The Comprehensive Commentary of the Holy Bible* (1834), of which it is said 120,000 volumes were sold; also an *Explanatory Bible Atlas and Scripture Gazetteer* (1849).

JEN'NER, Edward (1749–1823). An English physician, the discoverer of vaccination as a preventive of smallpox. He was born at Berkeley in Gloucestershire, where his father was vicar. With a view to his entrance into the medical profession, young Jenner was apprenticed to Daniel Ludlow of Sodbury, to learn surgery and pharmacy. In 1770 he went to London and became a student at St. George's Hospital and was a resident for two years in the family of John Hunter. Under Hunter's recommendation, young Jenner received the appointment to prepare and arrange the specimens of fauna and flora brought home by Captain Cook from his first voyage of discovery in 1771. Jenner's success in this matter led to his being offered the position of naturalist of Cook's second expedition, which he declined. He preferred life in a village and became a country surgeon in Berkeley, devoting the time not required by the practice of his profession to ornithology, botany, and mineralogy. Jenner appears to have been the first to suggest that angina pectoris is due to hardening of the coronary arteries. He also described the implication of the heart in cases of rheumatism, of which he was probably the discoverer. In 1792 he was invested with the degree of M.D. by the University of St. Andrews, Scotland.

The discovery of the prophylactic power of vaccination, on which Jenner's fame chiefly rests, was communicated to Edward Gardner in 1780. Jenner had given much thought and time to the study of smallpox, cowpox, and swinepox, and the development of the two latter diseases when communicated to man. He at first considered cowpox to be caused by the contagion of "grease," a hoof disease of horses. In conversation with Hunter in 1770 he had suggested the possibility of the prophylactic power of cowpox. A dread of disappointment influenced him to spend many years in observation and investigation before promulgating his discovery. He inoculated his son with swinepox and ascertained that the boy was proof against smallpox. Jenner performed his first public inoculation with vaccine on May 14, 1796. After passing through the disease of vaccinia the patient was exposed to smallpox by having its virus introduced into his arms, but without effect. Subsequent experiments yielded similar results. In

1798 he published the paper on vaccination, detailing the whole matter and stating his belief and his proofs. In the same year he visited London in order to demonstrate the truth of his assertions; but he was unable to prevail upon any one to submit to vaccination and was bitterly attacked by both physicians and clergymen. In one year, however, a revulsion of feeling took place, and a large number of leading physicians in the capital city declared, over their signatures, their confidence in vaccination, and the day was won. Jenner's high principle and pure motives were shown in his refusal to accept the suggestion of Cline, of St. Thomas's Hospital, to the effect that he should settle in London, where Cline promised him £10,000 a year as a result of his practice. Jenner gave almost his entire time to the demonstration and defense of his discovery, and his practice was nearly annihilated. A petition to Parliament by his friends resulted in a vote of £10,000 to Jenner in 1802, and he received a second grant of £20,000 in 1807. Yet inoculation, in spite of the fact that many deaths resulted from it, was continued at the Smallpox Hospital in London till 1822. In 1811 Jenner received a diamond ring from the Empress of Russia as a token of her admiration. She had the first child vaccinated in Russia named Vaccinoff and pensioned it for life. Jenner was named the first Honorary Associate of the Physical Society of Guy's; he was elected mayor of his native town; he received the freedom of the city of Dublin and of the city of Edinburgh; he was elected an honorary fellow of the Royal College of Physicians of Edinburgh; Oxford granted him the degree of Doctor in Medicine; the naval physicians and surgeons presented a gold medal to the discoverer, upon the adoption of vaccination in the British army and navy. France, Germany, Italy, Spain, Russia, and the United States adopted the practice of vaccination. The Hindus and the Chinese followed the example. In the East the appreciation of Jenner's labors and achievements was shown in public subscriptions of £4000 from Bengal, £2000 from Bombay, and £1383 from Madras. A statue of Jenner was placed in Gloucester Cathedral as a result of a public subscription, and in 1858 a statue was erected in London. In 1815, upon the death of his wife, Jenner retired to Berkeley, where he died of apoplexy.

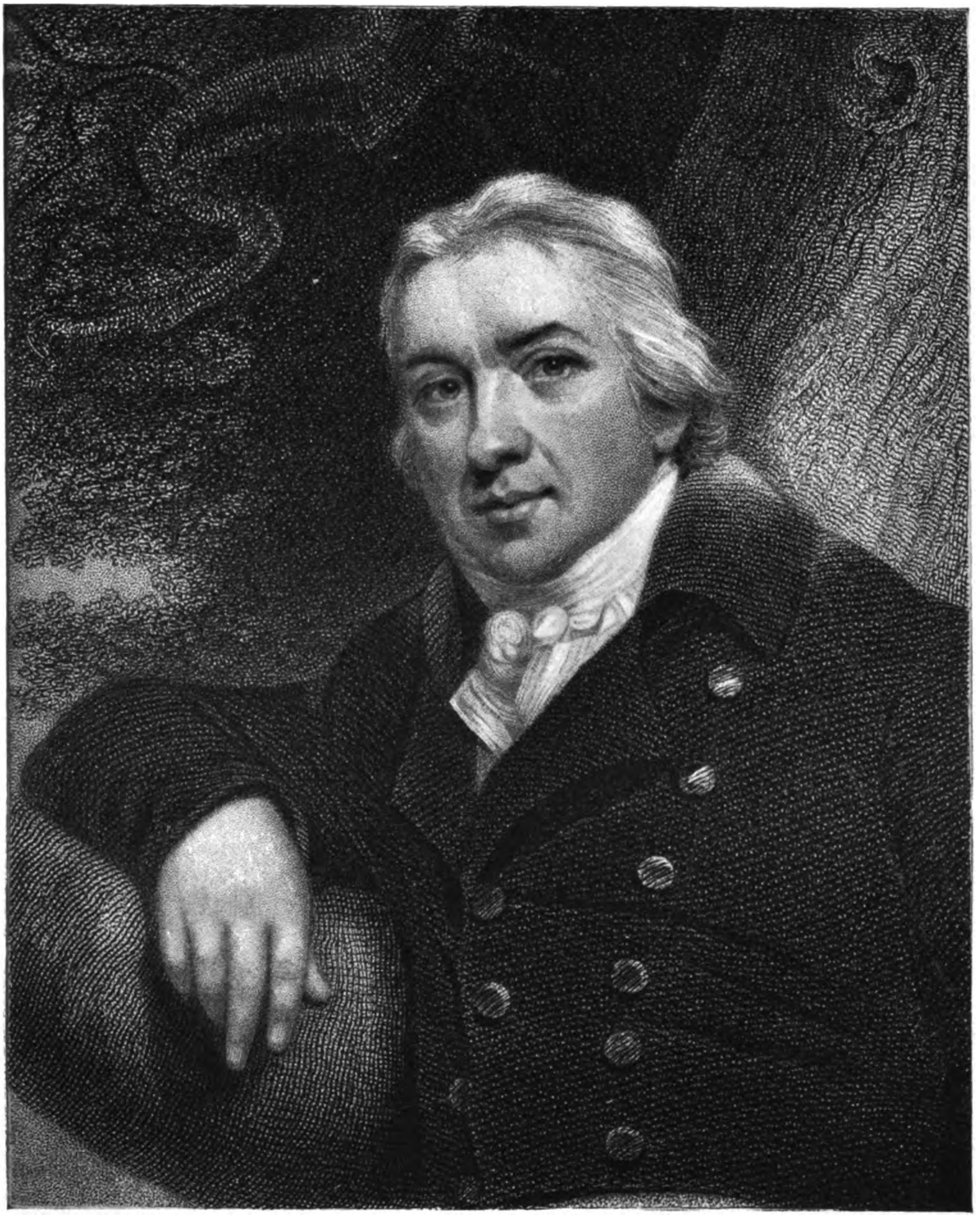
Among Jenner's published works are: "On the Natural History of the Cuckoo," in *Philosophical Transactions* (1788); "A Process for Preparing Pure Emetic Tartar," in *Philosophical Transactions* (1793); *Inquiry into the Cause and Effect of the Variolæ Vaccinæ* (1798); *Farther Observations on the Variolæ Vaccinæ* (1799); *A Continuation of Facts and Observations Relative to Variolæ Vaccinæ* (1800); *A Complete Statement of Facts and Observations Relative to the Cow-Pock* (1800); *On the Origin of Vaccine Inoculation* (1801); *On the Varieties and Modifications of the Vaccine Pustule, Occasioned by an Herpetic State of the Skin* (1804); "Observations on the Distemper in Dogs," in *Transactions of the Medico-Chirurgical Society* (1809); "Two Cases of Smallpox Infection, Communicated to the Fœtus in Utero," in *Transactions of the Medico-Chirurgical Society* (1809); *A Letter to C. H. Parry, on the Influence of Artificial Eruptions in Certain Diseases Incidental to the Human Body* (1822). Consult J. Baron, *Life of Jenner* (2 vols., London, 1838), and "Edward Jenner: His Life, his Work, and his Writings," in *British Medical Journal*, vol. ii (ib., 1902). See Vaccination.

JENNER, Sir William (1815–98). An English physician and surgeon, born at Chatham. He graduated M.R.C.S. at University College, London, in 1837, and M.D. in 1844, and in 1852 became a fellow of the Royal College of Physicians. In 1847, as a member of the staff of the London Fever Hospital, he commenced his minute observations on 1000 cases of fever, which resulted in the absolute differentiation of "typhus" and "typhoid," an achievement which established his fame. Their dissimilarity as "continued fever" had already been noticed, but was not confirmed until the publication of Jenner's conclusions. From 1849 he was professor of pathological anatomy at University College and assistant physician of the College Hospital, becoming physician in 1854. He resigned in 1876, became a consulting physician three years later, was named physician in ordinary to the royal family in 1861, and attended the Prince Consort in his last illness. In 1868 he was made Baronet and in 1872 Knight Commander of the Bath for his services during the illness of the Prince of Wales. His publications include: *On the Identity and Non-Identity of Typhoid Fever* (1850); the Gulstonian lectures on *Acute Specific Diseases* (1853); *Diphtheria: Its Symptoms and Treatment* (1861); *Lectures and Essays on Fevers and Diphtheria* (1893); *Clinical Lectures and Essays on Rickets, Tuberculosis, Abdominal Tumours and Other Subjects* (1895). Consult article, by D'Arcy Power, in *Dictionary of National Biography* (supp., vol. iii, London, 1901).

JEN'NET (OF. *genette*, Sp. *ginete*, nag, horseman, probably from Ar. *Zanâta*, name of a Barbary tribe famed for its cavalry). A breed of Spanish horses, which originated in the Middle Ages from a cross between an Arabian stallion and a native mare. They were widely celebrated for speed and grace, having much of the high-stepping action of the barb, and are believed to have contributed much to improve the stock of northern Europe about the sixteenth century.

JEN'NINGS. A city and the parish seat of Jefferson Davis Parish, La., 40 miles west of Lafayette, on the Southern Pacific Railroad and on the Mermenteau River (Map: Louisiana, D 6). It is situated in a rich rice, farming, fruit-growing, and lumbering region, and has machine shops, large rice mills, saw mills, and a screen and pump factory. The city contains a Carnegie library, St. Henry's Academy, an Elks Home, sanitarium, and fine high school and Federal buildings. The water works are owned by the municipality. Jennings adopted the commission form of government in 1913. Pop., 1900, 1539; 1910, 3925.

JENNINGS, Herbert Spencer (1868–). An American zoölogist. Born at Tonica, Ill., he was educated at the University of Michigan (B.S., 1893), at Harvard University (Ph.D., 1896), and at Jena, Germany (1896–97). He taught botany at the Montana State Agricultural College in 1897–98 and zoölogy at Dartmouth College in 1898–99 and at the universities of Michigan (1900–03) and Pennsylvania (1903–05). In 1906 he became professor of zoölogy, and in 1910 director of the zoölogical laboratory, at Johns Hopkins University. He directed the United States Fish Commission Biological Survey of the Great Lakes in 1901,



EDWARD JENNER
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became associate editor of the *Journal of Experimental Zoölogy* and of the *Journal of Animal Behavior*, and served as president of the American Zoölogical Society (1908–09) and of the American Society of Naturalists (1910–11). He published *Anatomy of the Cat* (1901), with Jacob Reighard; *Behavior of the Lower Organisms* (1906); and other researches on the physiology of microörganisms, on animal behavior, and on philosophical biology. In 1909 Clark University gave him the degree of LL.D.

JENNINGS, Louis John (1836–93). An Anglo-American journalist, editor, and author, born in London. In 1860 he joined the staff of the London *Times* and in 1863 went as its special correspondent to India, for a period acting as editor of the *Times of India.* After 1865 he succeeded Dr. Charles Mackay as the *Times* representative in the United States. In 1867 he married Miss Madeline Henriques, of New York, and took up his residence in that city. He was appointed to the editorship of the New York *Times*, and his tenure of that office was marked by his scathing and dauntless exposure of the malpractices in the municipal government of New York, which resulted in the prosecution and condemnation of the chief members of the Tweed Ring. In 1876 he returned to England and engaged in various literary pursuits and in politics, being elected Conservative member for Stockport in 1885 and 1886. His published works include: *Eighty Years of Republican Government in the United States* (1868); *Field Paths and Green Lanes: Being Country Walks Chiefly in Surrey and Sussex* (1877); *Rambles among the Hills in the Peak of Derbyshire and the South Downs* (1880); *The Millionaire: A Novel* (3 vols., 1883); *Mr. Gladstone: A Study* (1887). His last literary work was the editing of Lord Randolph Churchill's *Speeches with Notes and Introduction* (1889).

JENNINGS, Samuel (?–1708). An English Quaker, famous as a preacher and legislator in America. He emigrated from Buckinghamshire to Burlington, N. J., in 1680, and three years later, having previously acted as deputy, he was elected Governor of West Jersey, but afterward became a judge in Philadelphia. There he mixed in the controversies of the day, and when George Keith made a schism in the Quaker camp, it was Jennings who denounced him and upheld the action of his American coreligionists at the notable trial in London (1694). Upon his return to America he again made his home in Burlington, N. J., but frequently went on preaching tours through the Quaker districts of the other Colonies. He became Speaker of the local House and was instrumental in obtaining the recall of the unpopular British Governor, Lord Cornbury, and in establishing order in the civil government of West Jersey.

JENNINGS, Sarah, Duchess of Marlborough. (1660–1744). Wife of John Churchill, Duke of Marlborough (q.v.). She was born May 29, 1660, the daughter of Richard Jennings. She entered the household of Mary of Modena, the second Duchess of York, while still young, and became an attendant of the Princess Anne (later Queen Anne). Anne was an amiable but weak woman, and she was soon under the complete control of the beautiful and imperious Sarah Jennings. About 1676 John Churchill fell in love with her, and they were married two years later. By her influence over Anne she was of great assistance to her husband's career; but this was also cut short by her quarrels with Queen Anne, arising through the favor the latter showed to Mrs. Masham (q.v.). About the beginning of 1711 the Duchess of Marlborough was dismissed from all her offices. Thereafter her life consisted chiefly of a series of quarrels and lawsuits with friends and relatives. She died Oct. 18, 1744. There is an interesting correspondence in existence which she and Queen Anne carried on under the pseudonyms of Mrs. Freeman and Mrs. Morley respectively. Consult: *Private Correspondence of Sarah, Duchess of Marlborough* (2 vols., London, 1838); K. B. Thompson, *Memoirs of Sarah, Duchess of Marlborough* (2 vols., ib., 1839); Murray, *Letters of the Duchess of Marlborough* (ib., 1875); J. F. Molloy, *The Queen's Comrade* (ib., 1901); Mrs. O. S. C. Colville, *Duchess Sarah* (ib., 1904); S. J. Reid, *John, Duke, and Sarah, Duchess, of Marlborough* (New York, 1914).

JENSEN, yĕn'sĕn, Adolf (1837–79). A German song composer, born in Königsberg. He studied a short time under Ehlert and Marpurg, but was chiefly self-taught. He traveled and taught in Russia to secure funds for further study, and after his return was conductor at the Posen City Theatre in 1857. He lived in Copenhagen for two years in order to be near Niels Gade, after which he returned to Königsberg. From 1866 to 1868 he taught at Tausig's school in Berlin. While here his health gradually failed, compelling him to retire to Dresden, then to Gratz, and finally to Baden-Baden, where he died of consumption. He was a gifted and poetical writer of *Lieder* in the genre of Schumann and Franz and ranks little below those composers. His published songs number about 160 and include *Der Ungenannten*, six love songs after Geibel; six *Liebeslieder; Dolorosa*, six poems by Chamisso; *Gaudeamus*, 12 songs for bass; and some instrumental music, especially for the piano. He also wrote an opera entitled *Turandot.* Consult A. Niggli, *Jensen* (Berlin, 1900).

JENSEN, Gustav (1843–95). A German composer and violinist, born at Königsberg. He studied in Berlin under Laub, Dehn, and Joachim. From 1872 till his death he was professor of counterpoint at the Cologne Conservatory. As a composer, he lacks the charm and spontaneity of his brother Adolf (q.v.). Nevertheless his chamber music, choruses, pieces for piano, and songs command respect. His editions of older violin music, published under the title *Klassische Violinmusik*, are of permanent value.

JENSEN, Peter (1861–). A German Assyriologist, born in Bordeaux, France. He studied at the universities of Leipzig and Berlin. Devoting himself to the study of Semitic and Hittite archæology, after 1895 he was professor of Semitic philology, and of Oriental history in the Summer Session, at the University of Marburg. Among his publications are *Kosmologie der Babylonier* (1890); *Die Hittiter und Armenier* (1898); *Die Mythen und Epen der Babylonier* (1900); *Das Gilgameschepos in der Weltliteratur* (1906); *Moses, Jesus, Paulus* (1st and 2d ed., 1909; 3d ed., 1910); *Hat der Jesus der Evangelisten wirklich gelebt?* (1910).

JENSEN, Wilhelm (1837–1911). A German novelist, born at Heiligenhafen in Holstein. He studied medicine, later philosophy and literature, at Kiel, Würzburg, and Breslau, and lived later at Munich and Stuttgart, where he edited, from 1868, the *Schwäbische Volkszeitung;* at Flensburg, where he edited the *Norddeutsche Zeitung* (1869–72); at Kiel, at Freiburg in Breisgau, and, after 1888, in Munich. His earlier stories, under the influence of Storm (q.v.), e.g., *Die braune Erica* (1868) and *Eddystone* (1872), were prose idyls admirable in their descriptions. Urban and higher social life then attracted him, and with the novel *In der Fremde* (1887) he seemed to be emulating the French Bourget. Later he returned to his earlier manner, e.g., in *Im Zwing und Bann* (1892), a story of the Black Forest, scenes from which he described admirably in the well-illustrated *Der Schwarzwald* (3d ed., Berlin, 1901). His work is characterized by originality of fancy and emotional scenic description, but lacks clearly drawn characters. His shorter stories surpass his novels. Many of his poems are good. He published a great deal. Jensen published the poems *Vom Morgen zum Abend* and *Gesammelte Gedichte* (1897). His latest work includes the romance *Der Schleier der Maja* (1902); *Gäste auf Hohenaschau* (1904); *In Majorem Dei Gloriam* (1905); *Unter der Tarnkappe* (1907); *König Friedrich* (1908); *Die Nachfahren* (1909); *Deutsche Männer* (1909); *Ausgewählte Gedichte* (1913). Consult: Eadmann, *W. Jensen* (Leipzig, 1907); H. R. Jockisch, "Wilhelm Jensen, ein Widmungsblatt zum siebzigsten Geburstage des Dichters," in *Westermann's Monatshefte*, vol. li (Brunswick, 1907); Ludwig Fulda, article in the *Berliner Tageblatt*, No. 602 (Berlin, 1912).

JENSON, Nicolas (c.1400–80). A French stamp cutter and printer, born at Tours. He is supposed to have been sent by Charles VII from Paris to Mainz in 1458 in order to learn the art of printing. In 1470 he went to Venice, where in the following year he printed his first book; and before his death, in 1480, he produced from his presses no less than 155 volumes, including many editions now celebrated. Instead of the Gothic or black letters he introduced the antique or Roman characters in many of his books, and his style of type was soon copied in all Latin countries. Jenson was created Count Palatine by Pope Sixtus IV. Consult T. L. DeVinne, *Notable Printers of Italy during the Fifteenth Century* (New York, 1910).

JENYNS, jĕn′ĭnz, Soame (1704–87). An English author. He was born in London and was educated at St. John's College, Cambridge, but left before he had completed his course. He first attracted attention by writing, shortly after leaving Cambridge, a poem entitled *The Art of Dancing* (1727). He sat almost continuously in Parliament from 1742 to 1780 and in 1755 was appointed a Commissioner of the Board of Trade. A man of wealth and leisure, he cultivated the acquaintance of literary people and acquired a reputation, wholly undeserved, as a wit and writer. In thought he was shallow, in style wordy and turgid. His book entitled *A Free Enquiry into the Nature and Origin of Evil* (1757) was the subject of one of Dr. Johnson's most scathing and brilliant criticisms in the *Literary Magazine*. His best-known work was his *View of the Internal Evidence of the Christian Religion* (1776), which reached a tenth edition by 1795 and was translated into several Continental languages. His collected *Works* were published in 1790.

JEOFAILS, Statutes of. See Statutes of Jeofails.

JEOPARDY, jĕp′ar-dĭ (from OF. *jeu parti*, divided game, even chance, ML. *jocus partitus*, even chance, from Lat. *jocus*, jest, game, and *partitus*, p.p. of *partire*, to divide, from *pars*, part; influenced by popular etymology with OF., Fr. *jeu perdu*, lost game). In law, the peril incurred by a criminal process. The fifth amendment to the Constitution of the United States declares that no person shall be subject for the same offense to be twice put in jeopardy of life or limb. A similar provision is found in various State constitutions. Like most constitutional guarantees of protection to the individual, this is but a reënactment of a common-law rule; one which was enforceable in a criminal proceeding under the plea of *autrefois acquit* (q.v.). It is said that the phrase "jeopardy of life or limb" referred originally to the hazard of a party to a trial by battle (q.v.). At present, however, it denotes the risk imposed upon one who is subjected to a strictly criminal prosecution. The constitutional provision does not apply to a defendant in a civil action.

As to the question, at what stage of a criminal prosecution the accused is put in jeopardy to which he shall not be subjected a second time, the answers are not uniform. The great weight of authority supports the view that "a person is in jeopardy when he is put upon trial, before a court of competent jurisdiction, upon an indictment (q.v.) or information (q.v.) which is sufficient in form and substance to sustain a conviction, and a jury has been impaneled and sworn to try him." He then stands before the jurors as his judges, and, if he is charged with a capital crime, his life is in their hands. Accordingly, if he is acquitted by them, or if they are discharged by the court without his consent, except in cases of extreme necessity, such as the sickness or death of a juror, the constitutional provision applies, and he is not liable to a second prosecution. On the other hand, if the court had no jurisdiction of the case, or the indictment were fatally defective, or if the prisoner after conviction secured its reversal, the provision does not protect him from another trial. Consult Cooley, *General Principles of Constitutional Law* (Boston, 1900).

JEPHSON, jĕf′son, Robert (1736–1803). An Irish poet and playwright, who was a soldier in early life. He rose to be an infantry captain, but retired on half pay about 1763, and lived for the four following years in England, where he became friendly with Garrick, Goldsmith, Johnson, Burke, Reynolds, Townshend, Burney, and other lights in the literary, dramatic, and artistic firmament. He was always popular because of his Irish wit and social temperament; his plays were successfully produced in London, and after his return to Dublin he was master of the viceregal horse for many years and member of the national Parliament (1793). His tragedies are: *Braganza* (Drury Lane, 1775); *The Law of Lombardy* (1779); *The Count of Narbonne* (Covent Garden, 1781); *Julia, or the Italian Lover* (Drury Lane, 1787); *Conspiracy* (Drury Lane, 1796). In lighter vein he wrote the farce *The Hotel, or the Servant with Two Masters* (1784); *Campaign, or Love in the East Indies*, a comic opera (acted at Covent Garden in 1785, and presented in abbreviated form under the title *Love and War* in 1787); and the farce *Two Strings to your Bow* (Covent Garden, 1791). He published also in verse *Roman Portraits* (1794), and a satire on the French Revolution called *The Confessions of Jacques Baptiste Couteau* (1794).

JEPHTHA, jĕf′thȧ, *Ger. pron.* yĕf′tä. An oratorio by Handel (q.v.), first produced in London, Feb. 26, 1752; in the United States, Feb. 7, 1867 (Boston).

JEPH′THAH (Heb. *Yiphthāh*, he, i.e., the El, opens). A Gileadite, one of the judges of Israel. The story of his career, according to Judg. xi–xii, is as follows: He was a bastard and, being driven from home by his brothers, became the leader of a band of brigands. When the Ammonites oppressed Israel, the Gileadites appealed to Jephthah for aid. He rebuked them for coming to him only because in distress, but agreed to help them on condition that, if successful, he should remain their leader. Accordingly he went forth to battle against the Ammonites, first vowing to offer to Yahwe in case of success whatever should come to meet him from the door of his house on his return. He overcame the Ammonites, routing them entirely. On his return home his daughter, his only child, came forth out of the house, the first one to meet him. Being told of her father's vow, she agreed to its fulfillment, and Jephthah "did with her according to his vow" (Judg. xi. 39). Her fate was afterward bewailed by the daughters of Israel four days every year (Judg. xi. 39–40). The Ephraimites picked a quarrel with Jephthah because he had not asked them to join in the war against the Ammonites (cf. Judg. viii. 1). A combat ensued, and Jephthah was victorious. The story goes that, with his Gileadite forces, he held the fords against the Ephraimites and put to death every fugitive who betrayed his Ephraimitic origin by his inability to pronounce his *sh* sound, saying "sibboleth" for "shibboleth." Jephthah's judgeship lasted for six years, and he was buried in Gilead.

The story of Jephthah, when critically studied, reveals a curious mixture of myth and uncertain tradition. By general agreement among critics, the interview between Jephthah and the King of the Ammonites (Judg. xi. 12–28) is regarded as unhistorical, for the sufficient reason that the section in question refers to the Moabites. In the above account of Jephthah, therefore, no mention has been made of it. But there are other problems more difficult to solve. The account of the quarrel of the Ephraimites with Jephthah is so similar to an incident in the career of Gideon (Judg. viii. 1–3) that it is difficult to resist the conclusion that the incident has nothing to do with Jephthah. The incident with Jephthah's daughter rests presumably upon some actual occurrence of child sacrifice; and it has been suggested by Duhm that the name Jephthah was originally Jiphthahel, or 'the god who opens (the womb),' and to whom, therefore, the first-born belonged. In the form in which it is told is an attempt to account for a four days' festival celebrated annually in Gilead and elsewhere in Palestine, a feature of which was weeping by women. This festival is, without much question, that of Tammuz (q.v.)—the young god who is slain by a cruel goddess, and for whom the women (as the official mourners in the Orient, ancient and modern) sing dirges. This festival, we know from Ezekiel (viii. 14), was observed by Hebrews till a comparatively late date. There remains Jephthah's conflict with the Ammonites; and since this account contains an incident, as above pointed out, which confuses Moabites and Ammonites, it is clear that the later Hebrew writers did not have any very definite knowledge of Jephthah's career. His name remained in the memory of his people as a liberator from oppression by an enemy, but who the enemy was—whether Moabites or Ammonites—appears to have been forgotten. Consult commentaries on Judges by Moore and Budde, and the Hebrew histories of Stade, Guthe, Wellhausen, Kittel, etc.

JEPSON, Edgar (?–). An English novelist. He was born in London, studied at Leamington College and graduated B.A. at Balliol College, Oxford, and lived in Barbados in 1889–93. His books include: *Sibyl Falcon* (1895); *The Passion for Romance* (1896); *The Keepers of the People* (1898); *On the Edge of the Empire* (1900); *The Dictator's Daughter* (1902); *The Admirable Tinker* (1904); *The Lady Noggs, Peeress* (1905); *The Triumphs of Tinker* (1905); *The Four Philanthropists* (1906); *Tangled Wedlock* (1906); *The Mystery of the Myrtles* (1907); *Arsène Lupin* (1908); *No. 19* (1909); *The Girl's Head* (1910); *Captain Sentimental* (1911); *Pollyooly* (1911); *The House on the Mall* (1912); *The Terrible Twins* (1913); *The Intervening Lady* (1914); *Whitaker's Dukedom* (1914).

JEQUITINHONHA, zhä′kė-tė-nyō′nyȧ, or Rio Grande do Belmonte. A river on the east coast of Brazil, rising in the Serra do Espinhaco, in the Province of Minas Geraes, southwest of the town of Diamantina. It flows northeast, falling into the Atlantic at Belmonte, 200 miles south of Bahía (Map: Brazil, J 7). Its length is estimated at about 600 miles. The upper course, flowing through a mountainous country, is very rapid and forms a number of cataracts, one of which, the Salto Grande, has been compared with Niagara. Its lower course, in the State of Bahía, is through a flat country, where it is navigable for light vessels for about 60 miles.

JEŘÁBEK, yĕr′zhä-bĕk, František (1836–93). A Bohemian dramatist, born at Sobotka and educated in theology and philology at Leitmeritz and at Prague. He lived in the latter city, where he taught school and was prominent in journalism as editor of *Pokrok*, and in politics as a member of the Bohemian Diet and the Austrian Reichsrat. His dramas, all of unusual technical merit, include: *Hana* (1858); *Svatopluk* (1859); *Vesclohra* (1861); *Cesty veřejného miněni* (1866); *Služebnik svého pána* (Faithful Servant of his Master, 1870; Ger. trans., 1892), a powerful social play dealing with the conflict between intellect and capital; *Syn člověka* (The Son of Man, 1878), an historical play; and *Závist* (1885), portraying Bohemia in the time of Podiebrad. He also wrote a valuable history of early romantic poetry, *Stará doba romantického básnictví* (1884).

JERAHMEEL, jė-rä′mė-ĕl *or* yȧ-rä′mȧ-ĕl (Heb., El pities). The name of a tribe in the district of southern Syria called the Negeb (q.v.). In 1 Sam. xxvii. 10 David tells Achish that he has made a raid against the Negeb of Judah, the Negeb of the Jerahmeelites, and the Negeb of the Kenites; and in 1 Sam. xxx. 29 he sends of the spoil of Ziklag to the cities of the Jerahmeelites and the cities of the Kenites as well as to various cities of Judah. At that time Jerahmeel seems to have inhabited the centre of the great plateau of the Negeb, east of the Cherethites, or Cretans, and south of the Calebites, both mentioned in 1 Sam. xxx. 14, west of the Kenites, and north of the Amalekites, whose northern border apparently was the Wadi Kdês. They consequently occupied the part of the Negeb in which the ruins of important Byzantine cities still stand. Like the neighboring tribes, they were incorporated by David in the Kingdom of Judah. Hence their cities are counted as belonging to the tribe of Judah (q.v.), and in 1 Chron. ii. 9 Jerahmeel appears as the son of Hezron, the son of Perez, Judah's son with Tamar. When Jerahmeel is represented as the older brother of Caleb, this may indicate that the Jerahmeelites were considered as a more important people and known to have lived longer in the land than the Calebites. As the Jerahmeelite cities are also ascribed to Simeon, it is possible that this tribe was dispossessed by the Jerahmeelites. They seem to have been of Edomitish origin and were probably related to the Calebites and the Kenites. When the Nabatæans drove the Edomites out from their mountains across the Arabah into the Negeb, the Jerahmeelites and their kindred moved north into Judah, then decimated by the exile; but they seem to have maintained their separate tribal organization. Whether the name of the eponymous ancestor is that of their chief deity, "the pitying El," and identical with the Rahman of the Arabs, cannot be determined with certainty. Their location in earlier times renders it extremely probable that they exercised a considerable influence on the southern tribes, and therefore indirectly on all Israel; but until further testimony is brought forth the precise nature of this influence can only be conjectured. It is Cheyne's merit to have called attention to the importance of this tribe; and the services rendered by this eminent scholar by his attempt to recover its lost history and his demand for a more searching criticism of genealogies and place names should not be overlooked because of the violent textual emendations and the uncontrollable theories, similar to those of other scholars in reference to the Kenites, to which his discovery led him. *The Chronicles of Jerahmeel* is a collection of late Jewish legends of no historical value; this work has been published by M. Gaster (Orient Translation Fund, 1899). Consult: S. A. Cook, in *Encyclopædia Biblica* (4 vols., New York, 1899–1903); T. K. Cheyne, *Biblica Critica* (London, 1904); id., *The Decline and Fall of the Kingdom of Judah* (ib., 1908); id., *Fresh Voyages on Unfrequented Waters* (ib., 1914); Ed. Meyer, *Die Israeliten und ihre Nachbarstämme* (Halle, 1906); Nathaniel Schmidt, "The Jerahmeel Theory and the Historic Importance of the Negeb," in *Hibbert Journal* (London, 1908); T. K. Cheyne, *The Veil of Hebrew History* (ib., 1913).

JERBA, jĕr′bȧ, or **GERBI.** An island off the east coast of Tunis, Africa, in the Gulf of Cabes. Area, 425 square miles. The surface is level, and the soil fertile. The natives are engaged in the cultivation of dates and olives and the manufacture of silk and woolen fabrics. The town has a sponge market and an export trade in fruits. Pop., about 45,000, consisting largely of Berbers. There are on the island some Roman remains and an old Spanish castle. The chief town is Haumt-es-Suk, with a population of 3000. Jerba is the ancient Meninx, the island of the lotus-eaters. It has been occupied by the French since 1881.

JERBO′A, or **GERBOA** (from Ar. *yarbū'*, flesh of the back and loins, oblique descending muscle jerboa; so called from the great muscular development of the hind legs). A small rodent of the genus *Dipus* and family Dipodidæ, related to rats and mice and remarkable for its kangaroo-like characteristics. (See Plate of MICE AND JERBOAS with the article MOUSE.) The forelegs, more used as hands than as feet, are very small and have five toes, while the hind limbs are excessively long and strong and have only three toes, of which the middle (III) is prolonged. The tail is long, cylindrical, covered with short hair, and tufted at the end. The jerboas are inhabitants of sandy deserts and wide grassy plains in Asia and in eastern Europe and north Africa. They are burrowing animals, nocturnal, and feed upon roots, seeds, herbage, insects, birds' eggs, and the like, and where numerous greatly damage the grain crops. Their great legs enable them to flee from danger in enormous leaps, but when undisturbed they walk upright, one foot after the other, and do not hop like a kangaroo. They hibernate in the colder countries, but do not lay up stores as do many mice. The best-known species is *Dipus ægypticus*, of the north African plains. It is from six to eight inches long besides the tail, which is longer than the body.

Another group of jerboas, principally Asiatic, is distinguished by having five toes on the hind feet, and includes the alactaga (*Alactaga decumana*), an animal as large as a rat and one of the most characteristic animals of the Kirghiz steppes. Several lesser species of the same genus exist, and the great Siberian jumping rabbit of the genus *Euchoreutes* is another relative. Finally, the familiar jumping mouse (q.v.) of the United States is one of this family, as also are the ratlike rodents of northern Europe and Asia of the genus *Sminthus*, whose legs are all of nearly equal length, and whose habits are arboreal. These more regular forms are supposed to have least departed from the ancestral type. Consult: W. T. Blanford, *Observations on the Geology and Zoölogy of Abyssinia* (London, 1870); id., "Zoölogy and Geology of Eastern Persia," in his *Eastern Persia*, vol. ii (ib., 1876); id., *Fauna of British India: Mammalia* (ib., 1888–90); M. W. Lyon, *Comparison of the Osteology of the Jerboas and Jumping Mice* (Washington, 1901).

JERDAN, jĕr′dan, WILLIAM (1782–1869). A London journalist of Scottish birth. He left Kelso, his native place, for a writer's office in Edinburgh, but by 1806 had gone to the metropolis to engage in newspaper work, and made himself famous, a few years later, as the reporter who laid first hold upon Spencer Perceval's assassin in the lobby of the House of Commons. He was contributor to and editor of various journals, and from 1817 to 1850 was connected with the *Literary Gazette*, first as editor and shareholder, then as sole owner from 1842. His intimate association with the leading literary men of his time makes interesting reading of his reminiscences and *Autobiography* (4 vols., 1852–53), supplemented by *Men I have Known* (1866). Jerdan helped to establish the Royal Society of Literature (1821) and was always popular with his brother authors, who presented him with a testimonial upon his retirement in 1853, when the government gave him a pension of £100.

JER′EMI′AD. An expression, applied, often derisively, to speeches or writings of a perfervidly denunciatory character or in a strain of both violent and prophetic denunciation. The term is derived from the lamentations of Jeremiah. See Jeremiah, Lamentations of.

JER'EMI'AH (Heb. *Yirmeyâh*, *Yirmeyâhû*, Yahwe casts, hurls). One of the greatest of the Hebrew prophets. He was the son of Hilkiah and a member of a priestly family dwelling at Anathoth near Jerusalem. While the earliest references to him in the Old Testament are not older than the second century B.C., still it is possible, from a study of his discourses in the book that bears his name, to follow the general course of his career. The date of his birth may be fixed approximately at about 650 B.C., since we know that in 625 B.C. he came forward into public notice. Whether or not there was a local cult at Anathoth, to which Jeremiah may at one time have been attached, it is probable that after 620 B.C. the prophet's home was at Jerusalem, and that he remained there till the capture of the city. What called him to his prophetic ministry was the approach of the Scythians from the north. Having relieved their allies the Assyrians by forcing the Medes to abandon the siege of Nineveh in 625 B.C., the Scythians went forth to attack Psammetichus I of Egypt, who had been besieging Ashdod, a city claimed by Assyria. They were bought off by the Egyptians, but their coming into Syria filled Jeremiah (and also Zephaniah) with a conviction that Yahwe meant to punish through these his people Judah. Jeremiah frequently seems to have transferred to the Chaldæan power this rôle of punisher of Judah. The death of Josiah at Megiddo in 608, which threw the country into confusion, may have led to a reaction against the religious reforms instituted by the King, and which by his tragic death were demonstrated to be futile in averting the displeasure of Yahwe. In Jehoiakim's reign he seems to have protested against this King's guilty conduct in undertaking great building enterprises without paying the laborers engaged (xxii. 13 ff.). Even though his predictions concerning Jehoiakim failed and the King apparently died in peace and was "joined to his fathers," Jeremiah still looked for a Chaldæan army and threatened Jehoiachin and his mother with exile (xxii. 24–27, 29). Jeremiah develops into a prophet of gloom and woe, declaring that neither prayers nor sacrifices will avail to ward off the coming disaster, and that even the temple of Yahwe may be wiped out, as a punishment for the long period of defection on the part of the people. The refrain which sounds throughout his discourse is "too late." When the end came, Jeremiah counseled submission to Chaldæan authority. He deprecated, as did Josiah (q.v.), reliance upon Egypt, and he did not favor the attempt of Zedekiah to throw off the Babylonian yoke. In assuming this attitude Jeremiah was guided by his stern but profound conviction that the people of Yahwe had been guilty and must suffer the consequences. Naturally such a position rendered him exceedingly unpopular. He was denounced as manifesting lack of patriotism and no doubt endured much suffering and persecution, even though the accounts of his martyrdom were subsequently exaggerated. After the destruction of Jerusalem, in 586 B.C., he went to Egypt, if we may rely upon the statement embodied in the editorial revision of his utterances (xliii. 6, 7).

Bibliography. Cheyne, *Jeremiah: His Life and Times* (London, 1888); Marti, *Der Prophet Jeremia von Anatot* (Basel, 1889); Lazarus, *Der Prophet Jeremias* (Breslau, 1894); Schmidt, "Jeremiah," in *Encyclopædia Biblica* (New York, 1901); Erbt, *Jeremia und seine Zeit* (Leipzig, 1902); Gillies, *Jeremiah: The Man and his Message* (London, 1907); Buttenwieser, *The Prophets of Israel* (New York, 1914).

JEREMIAH, Book of. The second of the Latter Prophets in our present editions of the Hebrew Bible, though, according to the order given in the Babylonian Talmud (*Baba bathra* 14 b, 15 a) and followed in many manuscripts, it occupies the first place. In the general superscription the book is designated as "The word of Jeremiah, son of Hilkiah, who was of the priests in Anathoth in the land of Benjamin" (i. 1); i. 2 states that "the word of Yahwe came to him in the days of Josiah, son of Amon, king of Judah, in the thirteenth year of his reign"; and i. 3, that "it came in the days of Jehoiakim, son of Josiah, king of Judah, unto the end of the eleventh year of Zedekiah, son of Josiah, king of Judah, even to the deportation of Jerusalem in the fifth month." Apparently verse 2 was the heading of a book containing only oracles supposed to have come at the time when the prophet was called to his work; and verse 3 was added subsequently, when the book had come to contain prophecies of a later date, but as yet none that could be supposed to be later than the fall of Jerusalem in 586 B.C. In subheadings there are 27 other time indications, and in most instances there are direct ascriptions to Jeremiah in connection with them. The dates, however, are not in chronological order; prophecies assigned to Jehoiakim's time sometimes follow utterances said to have been made in the days of Zedekiah. Since Baruch is introduced in xxxvi. 4 ff. as the scribe to whom Jeremiah dictates his discourses in the fourth year of Jehoiakim, it has been supposed that the whole book came from him, and that he wrote the superscriptions. But there is no evidence of this, and it cannot even be rendered probable that the roll read by Baruch to Jehoiakim and rewritten by him after its destruction by the King has been preserved in the present volume. The one sentence quoted from that roll (xxxvi. 29) is not found in any oracle said to have been uttered by Jeremiah in the period before 604 B.C. A careful study of the headings tends to show that they were the work of editors and copyists living at different periods subsequent to the time of Jeremiah and Baruch. Their value is very great, however, for the aid they render in recovering earlier collections and in exhibiting the successive stages of redaction. They seem to indicate that the present work is a compilation of seven smaller collections, and that each of these once had an independent existence. These are: (1) i–xx; (2) xxi–xxiv; (3) xxv, xlvi–li; (4) xxvi–xxix; (5) xxx–xxxiii; (6) xxxiv–xxxix, xlv; (7) xl–xliv. Chapter lii is an appendix to the book. That the prophecies in chapters xxv, xlvi–li once circulated as a separate collection is evident from the different places they occupy in the Hebrew text and in the Greek version. While in the latter these oracles against foreign nations occupy a central position in the volume, like the similar prophecies in Isaiah and Ezekiel, they are in the former relegated to the end. More exactly their place is between xxv. 1–13 and 15–38 of the Hebrew text. Chapters xl–xliv cannot have formed a part of the volume when i. 3 was added to the superscription, for they deal entirely with things later than the fall of Jerusalem. Chapters xxx, xxxi are referred to as a book, and chapters xxxii, xxxiii, seem to be expansions of this book. It is probable that chapters i–xx formed the book to which the heading i. 2 was given, the editor supposing that all the prophecies came from the thirteenth year of Josiah. While it is frequently affirmed that the oracles came to Jeremiah, it is only in li. 60 that it is distinctly stated that he wrote the words against Babylon. Strangely enough, there is no prophecy in the whole volume that is more widely regarded as un-Jeremianic by interpreters belonging to different schools. Except in this case, the editors of the various collections apparently looked upon Jeremiah as an oracle giver, a public speaker, a preacher of righteousness and foreteller of coming doom, rather than as a holy penman, a scribe. This may have been due to the casual reference to Baruch.

The aim of the men who made these collections was evidently a twofold one: they were anxious to preserve what they, rightly or wrongly, regarded as genuine utterances of Jeremiah, as oracles of him who had foreseen the future and accurately foretold the destruction of temple, city, and dynasty; and they were desirous to furnish food for religious thought, stimulate holy sentiments, give comfort, encouragement, and hope by depicting the true prophet, uncompromising in his fidelity to Yahwe, full of deep love for his people, yet unsparing in his denunciations, even though he spoke with a bleeding heart. Very few scholars have any doubt that in these collections a number of actual utterances of Jeremiah have come down to us, and some reliable accounts of occurrences in his life. With most confidence such sayings of his are looked for in the first and second of the seven booklets (i.e., chaps. i–xxiv). But even here modern scholars are inclined to consider many passages as doubtful. The strongest evidences against Jeremianic authorship are cited by them in the case of the prophecies against foreign nations (chaps. xlvi–li). Though some go so far as to consider no part of chapters xxx–xxxiii as a genuine work of Jeremiah, there is a widespread feeling that some nucleus in chapters xxx–xxxi may have come from him. In the narratives, found in collections (4), (6), and (7), some episodes are very widely regarded as historical, while others are looked upon with suspicion even by the more conservative critics. It is thought probable that chapter lii comes from some good old source also used, though not so fully on some points, in 2 Kings xxv.

Though much excellent work was done by earlier scholars, both Catholic and Protestant, in elucidating the meaning of the various parts of the book, modern critical study may be considered as having begun in earnest with Dahler in 1825 and Movers in 1837. Dahler studied the book as a collection of somewhat independent sections, not coming from Baruch's pen, and divined the poetic character of Jeremiah's oracles, though he did not recognize a definite metre. Movers accepted the view, first propounded by Michaelis, that there were two recensions of the book, but took a long step forward by recognizing the impossibility of ascribing the longer text to Jeremiah or Baruch, and by assigning this text to a much later time, in his opinion the age of Nehemiah. More recent phases of criticism are represented by Pierson, Budde, Stade, Schwally, Smend, Davidson, Schmidt, Cornill, Duhm, Cheyne, Peake, and others. Pierson, in 1877, seems to have been the first to question seriously the historical character of some of the stories concerning the prophet. His criticism, though keen, was not always convincing, but where it has been known it has proved stimulating. Budde, in 1878, showed that chapters l–li have peculiarities that seem to preclude a Jeremianic origin, and this view has now been accepted by a very large number of scholars. Stade (1884–92) pointed out what appeared to him to be the secondary character of many psalm fragments and elegies, of the same nature as those in Lamentations (q.v.), interspersed between unquestionably genuine Jeremianic oracles. More or less convincing attempts have since been made, however, to vindicate these for the prophet. Schwally, in 1888, reached the same conclusions as regards chapters xlvi–xlix that Budde had adopted anent chapters l–li, and his opinion has also been widely accepted, sometimes on different grounds, though there are some independent scholars who maintain that in these oracles remnants have been preserved of actual utterances by Jeremiah. Smend, in 1893, indicated the difficulties with assuming that chapters xxx–xxxi come from Jeremiah, though many scholars have since suggested that here also there may be a Jeremianic nucleus. Davidson, in 1899, distinguished between the stories that seemed to him well informed and trustworthy and those in which "the narrator dramatizes the information at his command" and regarded such a passage as xlii. 7–22 "a free construction from the hand of the historian," and this "both on account of its rather debased style and its other peculiarities." Schmidt, in 1900 and 1901, was led by an examination of the superscriptions to the view that the book has grown up from the earlier collections which have been indicated above, very much after the fashion of the Book of Isaiah. He discarded as fruitless the search for Baruch's roll (mentioned in xxxvi. 29), assigned many more oracles to later times on internal grounds, and questioned the historical character of some of the stories he supposed to have been taken from a biography of the prophet written long after his death. The subsequent discovery of the Elephantine papyri (q.v.) has shown that in one respect his suspicions were not well founded, since there were early settlements of Jews in Egypt and they worshiped other gods as well as Yahwe; but it has otherwise thrown no light on the historicity of the accounts in chapters xl–xliv. Cornill, in 1901, recognized a metre in the poetical utterances of Jeremiah, but supposed that many of his sayings were not in poetic form. Duhm, in 1901, independently reached very similar conclusions to those of Schmidt on many points, but he adhered to the theory that Baruch's roll can be recovered in the present book, and he presented as a criterion of genuineness the peculiar metre characteristic of Jeremiah's oracles. His conviction that the prophet spoke exclusively in poetry led him to the position that only 60 short poems of 268 verses belong to Jeremiah, that 220 of the remaining 350 verses come from Baruch, and that 880 are from the hands of later supplementers. While in general agreement with the type of criticism that deviates most from traditional views, Cheyne, in 1911, was disinclined to assign a date as late as the Hasmonæan period for any part of the book; and Peake, in 1912–13, was inclined to seek for a Jeremianic nucleus wherever recent criticism, with which he dealt very fairly, seemed to yield the promise of such an original element.

Many difficulties worthy of serious consideration have been urged by conservative exegetes, and there can scarcely be said to be the same degree of unanimity among scholars as in the case of the Book of Isaiah (q.v.), though even in reference to that great thesaurus of prophetic oracles new points of view are being urged at the present time. Extraordinarily great problems are offered both by textual and historical criticism. While there is a strong presumption in favor of the view that a certain poetic form, a distinct rhythm and metre such as prophets in their moments of inspired exaltation naturally adopted, characterized the genuine Jeremianic prophecies, it cannot be regarded as absolutely certain that the prophet always employed it. Buttenwieser has recently maintained that Jeremiah did not know how to write, and therefore dictated his words to Baruch. This is difficult to believe, since he belonged to a priestly family. But if for some reason he was unable to put his discourses into writing, or did not care to do so ordinarily, not only Baruch but others who desired to take down his prophecies may have failed to recognize their poetic form or paid no attention to it, writing solely to record the substance, and later copyists may have departed even more radically from the original form. The margin necessarily left to the subjective judgment of the interpreter is very wide. However peculiar a man's style may be, it is subject to change in the course of 40 years; and what to one scholar may appear unmistakably to betray a later origin may to another seem quite in harmony with what is generally admitted as genuine. In such matters only a prolonged coöperation of competent students approaching the text from different points of view can lead to relatively assured results.

Bibliography. Among the commentaries the following deserve special mention; Dahler (Leipzig, 1825), Rosenmüller (Berlin, 1826), Ewald (Stuttgart, 1840; 2d ed., ib., 1868), Hitzig (Leipzig, 1841; 2d ed., ib., 1866), Neumann (ib., 1856–58), Graf (ib., 1862), Keil (ib., 1862), Rowland Williams (London, 1871), R. P. Smith (New York, 1875), Le Hir (Paris, 1877), Scholz (Wurzburg, 1880), Schneedorfer (Prague, 1881), Trochon (Paris, 1883), Cheyne (London, 1883–85), Orelli (New York, 1887; 3d ed., 1905), Knabenbauer (Paris, 1889), Ball, in *Expositor's Bible*, vol. i (London, 1890), Giesebrecht (Göttingen, 1894; 2d ed., ib., 1907), Bennett, in *Expositor's Bible*, vol. ii (ib., 1895), Streane (London, 1895), Myrberg (Upsala, 1896), Duhm (Freiburg, 1901), Cornill (Leipzig, 1905), Driver (London, 1906), Peake (ib., 1912–13); see also Movers, *De Utriusque Recensionis Vaticiniorum Jeremiæ Indole et Origine* (Hamburg, 1837); Pierson, *Israels Profeten* (Leyden, 1877); Budde, in *Jahrbücher für deutsche Theologie* (Gotha, 1878); Stade, in *Zeitschrift für alttestamentliche Wissenschaft* (Giessen, 1884, 1885, 1892); Schwally (ib., 1888); Cheyne, *Jeremiah: His Life and Times* (London, 1888); Marti, *Der Prophet Jeremia von Anatot* (Basel, 1889); Smend, *Alttestamentliche Religionsgeschichte* (Freiburg, 1893); Nathaniel Schmidt, in *The New World* (Boston, 1900); id., "Jeremiah, Book of," in *Encyclopædia Biblica* (New York, 1901); Cornill, *Die metrischen Stücke des Buches Jeremia reconstruirt* (Leipzig, 1901); Erbt, *Jeremia und seine Zeit* (ib., 1902); Giesebrecht, *Jeremias Metrik am Texte dargestellt* (Göttingen, 1905); Gillies, *Jeremiah: The Man and his Message* (London, 1907); Cheyne, "Jeremiah," in *Encyclopædia Britannica* (11th ed., Cambridge, Eng., 1911); Buttenwieser, *The Prophets of Israel*, vol. i (New York, 1914); Davidson, in Hastings, *Dictionary of the Bible* (ib., 1899).

JEREMIAH, EPISTLE OF. See APOCRYPHA, *Old Testament*.

JEREMIAH, LAMENTATIONS OF. The name given in the English Bible to a short book placed immediately after the Book of the Prophet Jeremiah. In the Hebrew it is called *'Ekāh* ('How,' the first word), sometimes also *Kinōth* ('Dirges'), and is placed among the Hagiographa. The title in the Greek version is Θρῆνοι, *Thrēnoi*, a translation of *Kinōth*. The book consists of five chapters, which may be designated as so many elegies or dirges over the desolation of the land, the exile of the people, the destruction of the first temple, the fall of the Kingdom of Judah, and the writer's own woes. Properly speaking, only chapters i, ii, and iv are dirges, bewailing the death of the Jewish nation. Chapter iii deals with the affliction of the people, or rather of the pious section of the community. Chapter v is in the form of a prayer. The elegies are in poetical form, the metre of the first four being that commonly employed in dirges in the ancient and modern Orient—the so-called Kinah strain. Each verse member is divided by a cæsura into two unequal parts, of which the first is the longer; the second usually presents an enforcement of the thought contained in the first. This unequal proportion between the two parts of a verse member gives to the lines a limping character. In chapters i and ii the verses consist of three members; in chapter iii of one member; in chapter iv of two members. The metre of the fifth poem consists of three-toned lines. The structure of the elegies is very artificial. The first, second, and fourth each contain 22 verses, each verse beginning with a different letter of the Hebrew alphabet arranged in the usual order, except that in i and iv the seventeenth letter of the alphabet, according to the ordinary arrangement (*pe*), precedes the sixteenth (*ayin*). In chapter iii the same order of the letters of the alphabet is followed as in i and iv, but there are three successive lines beginning with the same letter, making 66 verses in all. Chapter v contains 22 verses, but their initial letters are not in alphabetic order.

The contents of the five elegies may be summarized as follows: 1. Lamentation over the state of Jerusalem after the people had been carried captive; its sins acknowledged as the just cause of its misfortunes; Yahwe approached with penitence as the only source of help. 2. The destruction of the city and sufferings of its people lamented; false prophets condemned; Yahwe again invoked as alone able to save. 3. Description of the affliction of the religious community under the type of a single individual, as in the songs of the "servant of Yahwe" in Isaiah (q.v.). The sufferings are regarded as just punishments, and the speaker expresses confidence in Yahwe's ultimate compassion. 4. Lamentation over present conditions in contrast with former prosperity; all misfortune confessed to be the result of transgression and sin. 5. A final appeal to Yahwe; the calamities of the nation again recited; the sins that caused them penitently confessed; and Yahwe entreated to turn His people back to Himself and to renew the blessings they had formerly enjoyed. The last verse contains a sentiment that was considered to be of ill omen, and hence in reading the book it became customary to repeat the preceding verse, which embodies the appeal for a return of divine grace.

Concerning the authorship and date of the poems, opinions are at variance. The internal evidence is not conclusive. The tradition assigning the entire book to Jeremiah may be traced to the Greek version, but it should be noted that not all manuscripts contain this ascription. The tradition is thought by some to be based upon the late statement in 2 Chron. xxxv. 25 that Jeremiah was the author of an elegy upon King Josiah. On the whole, modern scholars reject Jeremiah's authorship of the book. But it is freely admitted that it shows influences of his style and thought. The compositions are evidently specimens of the elegiac literature of the Jews, suggested by the national catastrophe and the sufferings of the postexilic community, especially during the first century after the return and again under the Seleucid rule. Some critics think that no two poems have the same author, and the most plausible arrangement with respect to date is ii, iv, i, v, iii. Chapters ii and iv have more in common than any of the others. Comparison with sentiments in the Psalms that belong to the later Persian period speaks in favor of placing these two chapters about the middle of the fourth century B.C. There is no reason to assume a long interval between ii and iv on the one side and i and v on the other. Chapter iii may belong to the age of Greek supremacy.

Consult: commentaries of Ewald, Thenius, Nägelsbach, Keil, Payne Smith, Cheyne, Plumptre, Löhr, *Die Klagelieder Jeremias* (Göttingen, 1891–94), and Minocchi, *Le Lamentazioni di Geremia* (Rome, 1897), and the Introductions to the Old Testament by Driver (rev. ed., 1910) and Sellin (1913). For the metre, consult Budde's articles in the *Zeitschrift für alttestamentliche Wissenschaft* (1882–94), and in the *New World* (Boston, March, 1893).

JEREMIAH, SHORT PROPHECY OF. See APOCRYPHA, *Old Testament*.

JÉRÉMIE, zhā′rā′mē′. A port of the Republic of Haiti, situated on the north shore of the southwest peninsula of the island of Haiti, 120 miles west of Port au Prince (Map: West Indies, D 3). It is celebrated as the birthplace of the elder Dumas. It has a poor harbor. It is the residence of a United States consular agent and exports cacao, coffee, and logwood. Pop., 5000.

JERES, CONDE DE. See CERVERA Y TOPETE, PASCUAL, CONDE DE JEREZ, MARQUÉS DE SANTA ANNA.

JÉREZ DE LA FRONTERA, HĀ′rāth dā lȧ frôn-tā′rȧ, or XÉREZ. A famous city in the Province of Cadiz, Spain, situated near the river Guadalete, 33 miles by rail and 14 miles in a straight line northeast of Cadiz (Map: Spain, B 4). It is surrounded by extensive vineyards, which furnish the world-famous sherry wine. The town is divided into two parts, of which the old one is surrounded by the remains of Moorish walls. There are an old Moorish castle, several theatres, and a bull ring. The educational institutions of the city include a high school, schools of law, medicine, and agriculture, a literary and scientific society, and a municipal library housed in the interesting old consistorial palace. In the neighborhood of the city is the convent of La Cartuja, considered the grandest architectural monument of the province; it is surrounded by fine gardens, the entrance to which is in the form of a large triumphal arch. Among the chief objects of interest in the town are the immense wine cellars, or *bodegas*, in which are stored large casks of sherry and other wines, which are exported mostly to Great Britain, the United States, and France. Pop., 1887, 61,708; 1900, 60,846; 1910, 62,628. Jérez was once a Roman colony and fell into the hands of the Arabs at the beginning of the eighth century. The great battle in which the Saracens overwhelmed the Visigoths was fought here in 711. In 1264 it was taken by Alfonso X of Castile. Peter the Cruel had his young wife, Blanche de Bourbon, murdered here in 1362.

JÉREZ DE LOS CABALLEROS, dā lôs kā′-BȦ-lyā′rôs. A town of southwest Spain in the Province of Badajoz, 15 miles from the Portuguese frontier (Map: Spain, B 3). It is a handsome town, situated among the mountains, surrounded by gardens and orange groves, and dominated by a fortress with three enormous towers. It has two theatres, two hospitals, and a bull ring. There are several flour mills and manufactures of leather, soap, and pottery. Pop., 1900, 10,095; 1910, 10,940. The town is supposed to have been founded by the Phœnicians. It was captured from the Moors by Alfonso IX of León, who handed it over to the Knights Templars, whence the name Caballeros.

JERFALCON. See GYRFALCON.

JERICHAU, jā′rê-KOU, JENS ADOLF (1816–83). A Danish sculptor, born at Assens (Fünen). He studied in his native country and under Thorvaldsen at Rome. He established a reputation by a frieze, representing the marriage of Alexander the Great and Roxana, for the Royal Palace at Christiansborg, and after his return he was made professor at the Academy of Copenhagen (1849). Among his principal works are "Hercules and Hebe," "Penelope," "The Panther Hunter," "Adam and Eve after the Fall," "Christ," "David," and the monuments to Oersted and Andersen at Copenhagen.—His wife, ELIZABETH BAUMANN (1819–81), born at Warsaw, Poland, was a genre painter of note. She studied at Düsseldorf and devoted herself at first to Slovakian, then to Italian, Greek, and Egyptian subjects. Her paintings are deficient in drawing, but show ability in the use of decorative color.—Their son, HARALD (1851–78), born at Copenhagen, a pupil of his mother and afterward of Bénouville in Rome, was a landscape painter of some distinction. He painted Roman, Greek, and Turkish subjects.

JERICHO, jĕr′ĭ-kō. An ancient city of Palestine, about 15 miles east-northeast of Jerusalem, in the Jordan valley, north of the Dead Sea (Map: Palestine, C 4). A Canaanitish city existed here before the invasion of Palestine by the Hebrew tribes. Joshua is said to have captured and destroyed it. The story of the manner in which the wall fell, after the children of Israel had marched around it seven times blowing their trumpets (Josh. ii–viii), is regarded by many students as a legendary embellishment. It seems to have been the inner wall of stone, with its towers and its parallel wall of brick, that stood there in the pre-Israelitish period. Judging from the account of the spoils, the city must have been very rich, and that is borne out by the results of the excavations.

According to Josh. vi. 26 the conqueror pronounced a curse upon any one who should rebuild the city. This is thought by some scholars to be a reflection of the feelings aroused by the rebuilding of the city by Hiel of Bethel. He is said to have laid the foundation thereof with the loss of Abiram his first-born and set up the gates thereof with the loss of his youngest son Segub (1 Kings xvi. 34). The impressive wall uncovered by Sellin and Watzinger shows the extraordinary power and skill of this man. It coils like a gigantic serpent around the whole city, solidly built, though without mortar, with nowhere a corner, a bastion, or a tower. A large structure within this wall has been supposed by the excavators to be Hiel's house. Hiel apparently shunned no sacrifice to carry out his project, and the cost he paid created or strengthened the idea that the city lay under a curse. There is evidence that it was inhabited during the centuries preceding Hiel's enterprise, but on a smaller scale than later.

King Zedekiah was captured in the plain of Jericho (2 Kings xxv. 5). From the fifth to the second century B.C. there was a Jewish settlement in Jericho. Some jar handles have been found on which are written in Aramaic letters the name of the god Yahu or Yah. Down to this time the city was located at the foot of Mount Karantal, at Tell el-Sultan, near the spring called Ain el-Sultan, whose waters are supposed to have been healed by Elisha (2 Kings ii. 19–22). Farther south, at Tell abu-alaik, the ruins of the Jericho of the Hellenistic period stand. These have been excavated by Sellin under the auspices of the Deutsche Orient-Gesellschaft in 1909 and 1911. The outlines of a theatre or hippodrome were discerned and aqueducts and cisterns found. This is the Jericho on which Herod lavished his care (Josephus, *Jewish War*, i, 21, 9). Through this city Jesus passed on his last journey to Jerusalem, when Zacchæus climbed into the sycamore tree to see him (Luke xix. 1–8). Vespasian destroyed the city, but it was rebuilt. At the time of Constantine it was the seat of a bishop. Justinian caused a "church of the mother of God" to be restored and a hospice for pilgrims to be erected. The Jericho on the present site, El Riha, grew up in the time of the Crusades. A church and a castle testify to the presence of the Crusaders there. Jericho is situated in an extremely fruitful district, yielding figs, grapes, balsam, honey, etc. Josephus and Strabo speak of it in enthusiastic terms. As late as the seventh century A.D. palm trees were common, but it is not certain that Deut. xxxiv. 3 alludes to it as the city of palm trees. The village is the seat of a mudir and has about 300 inhabitants. Karantal is the traditional place of the temptation of Jesus. There are many hermits' caves and chapels there. Much remains still to be done before Jericho can be said to be completely excavated, but the work carried on by Sellin and Watzinger has been sufficient to indicate from the remains the general course of the history of the city. Consult: Guérin, *Samarie*, vol. i (Paris, 1874); Vincent, in *Révue Biblique* (ib., 1908–10); G. A. Smith, *Historical Geography of the Holy Land* (16th ed., London, 1910); Thiersch, in *Zeitschrift des deutschen Palästina Vereins* (Leipzig, 1913); Sellin and Watzinger, "Jericho: Die Ergebnisse der Ausgrabungen," in *Wissenschaftliche Veröffentlichung der deutschen Orient-Gesellschaft*, vol. xxii (ib., 1913).

JERICHO, ROSE OF. A Syrian cruciferous plant. See ROSE OF JERICHO.

JERKED MEAT, or **JERKEY** (Chilean *charqui*, dried beef). Meat preserved by drying in the sun. Hot dry weather is essential to the process. In the case of beef the fat is completely removed, and the lean meat is split into thin flakes, which are slit at irregular intervals in order to facilitate the drying. These thin steaks are spread out, or hung up in the sun, in a spot where there is a free circulation of air. The drying process takes from one to three days, depending upon the climate, and when completed the meat is brown, tough, and leathery, and will keep indefinitely if preserved from moisture and insects.

Venison and mutton are also preserved in the same manner, occasionally being cut into strips instead of flakes, dipped in brine, or smoked slightly.

The Indians of North America used to prepare quantities of buffalo meat in this manner, a portion of which was afterward pounded to make pemmican (q.v.). Good jerkey is eaten either cooked or raw, is exceedingly nourishing, and when raw has a rather pleasant, slightly saline flavor.

JERKER. The river chub. See CHUB.

JERMYN, jẽr′mĭn. A borough in Lackawanna Co., Pa., 12 miles northeast of Scranton, on the Lackawanna River and on the Delaware and Hudson and the Ontario and Western railroads. It is situated in a productive anthracite coal field, and, besides coal mines, the industrial establishments include cut-glass works, silk, powder, grist, planing, and saw mills, bottling works, and fertilizer factories. Pop., 1900, 2567; 1910, 3158.

JER′OBO′AM I (Heb. *Yārŏb'ām*, probably 'Amm fights'). The first King of the Kingdom of Israel (c.953–932 B.C.). He was the son of Nebat of the tribe of Ephraim and had charge, under King Solomon, of the house of Joseph. He conspired against Solomon, but failed in his venture and was compelled to flee to Egypt (1 Kings xi. 26–40). The details of the movement, which was probably instigated by the restless spirit of the north under Judæan rule, are not furnished. The incident of the prophet Ahijah (1 Kings xi. 29–39) is thought by some critics to be a legendary embellishment; but there is nothing improbable in the attitude of Ahijah or the symbolic act, though the original oracle seems to have been expounded in later times. On the death of Solomon Jeroboam returned from Egypt and took the lead in another revolt at Shechem. Formal demands were made of Rehoboam, the son of Solomon, to reduce the taxes and otherwise change the policy adopted by his father. Rehoboam naturally refused, and the northern tribe seceded, Jeroboam becoming King of Israel (1 Kings xii. 2–20). Wars between Jeroboam and Rehoboam and his successor, Abijam, were frequent (1 Kings xiv. 30; xv. 7). The compiler of the Book of Kings, writing from the exilic point of view, which recognized the temple at Jerusalem as the only legitimate centre of Yahwe worship, represents Jeroboam as fearing defection if the people continued to journey to Jerusalem for worship, and for this reason setting up a cult of his own at Bethel and at Dan (1 Kings xii. 26–33). It is the opinion of scholars at present, however, that, as a matter of fact, the idea of centralization of worship in one place did not exist at this time, and the northern tribes naturally recognized Bethel and Dan (q.v.) as they did other sanctuaries of the north as suitable places of worship. At these places a yearly harvest festival was celebrated on the fifteenth day of the eighth month, and Yahwe was worshiped under the form of a golden or gilded image of a bull. See GOLDEN CALF.

JEROBOAM II. King of Israel (c.782–740 B.C.). He was the son of Joash or Jehoash, third King of the Jehu dynasty. The account of his reign (2 Kings xiv. 23–29) is exceedingly brief, but shows that he was a warrior who succeeded in restoring the prestige of his kingdom and regaining from the ruler of Damascus regions lost by his predecessors. Whether, however, he actually secured control of Damascus and Hamath, as is stated, is doubtful. If he did so, it must have been with the help and connivance of Assyria. The ministry of Amos (q.v.) and Hosea (q.v.) falls in Jeroboam's reign, which must in every respect have been an eventful one. Consult Wellhausen, *Israelitische und jüdische Geschichte* (7th ed., Berlin, 1914).

JEROME, jė-rōm′. A town in Yavapai Co., Ariz., 44 miles by rail northeast of Prescott, on the United Verde Railroad (Map: Arizona, C 3). It is situated in a rich copper country, and there are extensive mines. Gold is also found here. Points of interest in the vicinity are Montezuma Wells, Montezuma Castle, Fort Whipple, and Camp Verde, a government post. Pop., 1900, 2861; 1910, 2393.

JEROME, JEROME KLAPKA (1859–). An English humorist, born at Walsall, Staffordshire, May 2, 1859. He was educated at the Philological School, Marylebone. As a young man, he was for a time a clerk in a railroad office and later an actor at Astley's Theatre, London, and in the provincial cities. Subsequently he became in turn a journalist, a teacher, a shorthand writer, and a lawyer's clerk. A brief account of his experiences on the stage he gave in *On the Stage—and Off* (1888), followed a year later by *Stage Land,* dealing with the conventions of the drama. His connection with the theatre enabled him to write several good comedies and farces: *Barbara* (1886); *Sunset* (1888); *Wood Barrow Farm* (1891); *New Lamps for Old* (1890); *Mac Haggis* (1897); *Miss Hobbs* (1900). Among his clever essays and sketches or short stories are: *Idle Thoughts of an Idle Fellow* (1st ser., 1889; 2d ser., 1898); *Three Men in a Boat,* his most humorous production (1889); *Diary of a Pilgrimage,* sketches of an excursion to the Oberammergau Passion Play (1891); *Novel Notes* (1893); *John Ingerfield, and Other Stories* (1893); *Sketches in Lavender* (1897); *Paul Kelver* (1902); *Tommy & Co.* (1904); *The Passing of the Third Floor Back* (1907), in which Sir Johnston Forbes-Robertson played with great success; *They and I* (1909); *The Master of Mrs. Chilvers* (1911); *Esther Castways* (1913); *Poor Little Thing* (1914). In 1914 he came to America to give readings from his most popular books.

JEROME (Lat. *Hieronymus,* from Gk. Ἱερώνυμος, *Hierōnymos*), SAINT (c.340–420). The most learned of the early fathers of the Latin church. His full name is usually given as Sophronius Eusebius Hieronymus, and he was born in Stridon, a town on the border of Dalmatia and Pannonia. Prosper of Aquitania gives 331 as the year of his birth, but that is probably too early. It may have been 342 or 346. Among his eminent contemporaries were Ambrose and Augustine. His parents were wealthy Christians. Jerome was educated in Rome, under the rhetorician Ælius Donatus, where his tastes foretold the scholar; he began to gather a library by copying manuscripts for himself. Here also he received baptism. His strictly theological studies were begun in Treves and continued in Aquileia, where he had Rufinus as a comrade and friend. Traveling in the East, Jerome fell sick (in Syria) and passed through a religious experience in which he was led to adopt the ascetic life. He saw a vision, and heard a voice saying, "Thou are not a Christian, but a Ciceronian!" This he took as a divine rebuke of his fondness for the classics, and he resolved henceforth to abandon secular literature altogether. But his writings show that he never really shook off the influence of his classical training. Jerome's hermit life began in 374, in the desert of Chalcis (the Syrian Thebais), where he studied Hebrew with a converted Jew. After visiting Antioch and Constantinople, where he met Gregory of Nazianzus, Jerome spent three years in Rome (382–385), in close association with Pope Damasus, at whose wish he commenced his translation of the Scriptures into Latin. His Roman career began with great popularity, but ended with unpopularity and bitter quarrels. During these years he became acquainted with certain noble Christian ladies, especially Marcella and Paula, who were devoted to the Church and aided it with their wealth. Paula and her daughter, Eustochium, accompanied Jerome to the East, where they settled at Bethlehem (386). Here Paula built a monastery for men, over which Jerome presided, and cloisters for women, which were under her own direction. Jerome spent the remaining 35 years of his life here, engaged in study and writing, in the practice of asceticism, and in theological controversies.

Jerome's life and work illustrate the combination and conflict of pagan and ascetic Christian ideas, so common in the fourth century. He has been described as a precursor of the Humanists, but this takes into account only one side of his character. He was also an exponent of the monastic ideal, whose growth he furthered, particularly in the West. His later life was filled with theological controversies in which he sometimes displayed an extreme asperity. For the history of his age, Jerome's numerous writings are of the highest value. His Latin translation of the Bible, far superior to any of the Latin versions which preceded it, lies at the basis of the Vulgate. (See BIBLE.) He also wrote commentaries on several books of the Bible. His work entitled *Illustrious Men* (*De Viris Illustribus*), written in 392, is a series of 135 short biographies of Christian leaders, beginning with St. Peter and ending with Jerome himself. It was largely compiled from the *Ecclesiastical History* of Eusebius. He translated and continued Eusebius' *Chronicle*. (See Eusebius of Cæsarea.) More than 100 of his *Letters* have been preserved, in which many varying topics are discussed in a very interesting and lively way. This collection was much read throughout the Middle Ages. Among his ascetic treatises the *Twenty-second Epistle*, addressed to Eustochium, is one of the most famous. Other similar treatises are the lives of Paul of Thebes, of St. Hilarion, and of Malchus, and the bitter polemics against Jovinian and Vigilantius. Jerome became involved in warm disputes with his old friend Rufinus—over the theology of Origen, which he came to oppose bitterly—and with the Pelagians. The most interesting part of his correspondence is with Augustine, who had great respect for him, but disagreed with some of his positions.

Jerome's works were first edited by Erasmus (9 vols., Basel, 1516–20). The best edition is by Vallarsi (11 vols., Verona, 1734–42; Venice, 1766–72; reprinted by Migne in *Patrol. Lat.*, vols. xxii–xxx). The best edition of the *De Viris Illustribus* is by Richardson, in *Texte und Untersuchungen*, vol. xiv (Leipzig, 1896). An English translation of his principal works is in *The Select Library of Nicene and Post-Nicene Fathers*, edited by Schaff and Wace, vols. iii and vi (New York, 1892 et seq.).

Bibliography. Ebert, *Geschichte der Litteratur des Mittelalters* (Leipzig, 1889); Dill, *Roman Society in the Last Century of the Western Empire* (London, 1899); Glover, *Life and Letters in the Fourth Century* (Cambridge, 1901); Bardenhewer, *Patrologie* (Freiburg, 1901). For his life, consult also: Zöckler (Gotha, 1865); Cutts (London, 1878); Martin (ib., 1888); Farrar, *Lives of the Fathers*, vol. ii (Edinburgh, 1889); Grützmacher (Berlin, 1901, 1906, 1908).

JEROME, Thomas Spencer (c.1863–1914). An American classical scholar, son of a rich miner and railway man who became Governor of Michigan. He graduated at the University of Michigan in 1884, studied law there and at Harvard, and practiced in Detroit for a few years. Then, with his friend C. W. Freer, he settled in Capri, Italy, where he became consular agent and began a great critical study of Roman history, which was interrupted by his sudden death. His published work, *Roman Memories in the Landscape Seen from Capri* (1914), made up of his miscellaneous notes and brought out at the very time of his death, is a brilliant example of modern psychological analysis of the Latin historians.

JEROME, William Travers (1859–). An American lawyer, born in New York City. He received his academic training at Williston Seminary, at a preparatory school in Switzerland, and at Amherst College. On account of ill health he was forced to leave college in the junior year, but in 1892 was given an honorary A.M. degree. In 1884 he graduated from the law school of Columbia University. As assistant district attorney of New York County in 1888–90, and as assistant counsel for the Lexow Committee (see Lexow, Clarence), he gained a first-hand knowledge of criminal conditions in the city. In 1895 he managed the anti-Tammany campaign which brought about the election of Col. A. L. Strong as mayor. Appointed by Strong a judge of the court of special sessions, he served until 1901, when he was elected district attorney on the Democratic ticket. He proceeded to reorganize the office force and began an energetic prosecution of gambling houses—in order to be in close touch with conditions taking up his residence and opening an auxiliary office on the East Side; and he drew up and advocated before the Assembly a bill which granted immunity to witnesses in the gambling-house cases. The honesty and efficiency with which he conducted his office made him widely popular irrespective of party; and when, in 1905, he ran for reëlection on an independent ticket, he received contributions from many States of the Union. He made a vigorous campaign and was elected. In his second administration he conducted the prosecution in both of the trials of Harry K. Thaw for the murder of Stanford White (q.v.). In 1908 he was severely censured by the press for failure to prosecute certain individuals charged with crime. Governor Hughes appointed a commissioner to investigate the charges, and Jerome was entirely exonerated. After Thaw had been sent to Matteawan State Hospital for the Criminal Insane, and a legal fight for his release had been begun, in 1913 Jerome was retained as counsel by the State Attorney-General. His success in this contest was followed by Thaw's sensational escape to Canada. Again the former district attorney's services were secured, but in January, 1915, without public explanation, he was dropped from the case. (See Thaw Case.) Jerome published *Liquor Tax Law in New York* (1905).

JEROME OF PRAGUE (?–1416). The associate of John Huss. He was born at Prague in the latter half of the fourteenth century. After attending the university of his native town, he continued his studies at Oxford, Heidelberg, Cologne, and Paris, where he attracted attention by his defense of Wiclif. He took his master's degree at Paris and taught there and also at Cologne. After a journey to Jerusalem he returned to Prague in 1407 and began to introduce the writings and opinions of Wiclif in his native land. His reputation for learning was so great that his advice was taken by Ladislas II, King of Poland, with respect to the reorganization of the University of Cracow in 1410. He entered into the contest carried on by his friend Huss with more zeal than judgment. He publicly trampled the relics under his feet, committed to prison the monks who did not share his opinions, and even ordered one of them to be thrown into the Moldau. When Huss was arrested at Constance, Jerome hastened to defend him, but not receiving a safe-conduct, for which he had applied, set out to return to Prague. He was arrested at Hirschau, April, 1415, and conveyed in chains to Constance. Here he was cast into a dungeon and placed on trial. After some months' imprisonment he recanted his opinions, September, 1415, but in May, 1416, abjured his recantation with horror, and was burned at the stake, May 30. Consult William Gilpin, *Lives of John Wicliff and of the most Eminent of his Disciples* (New York, 1814), and the life by Heller (Lübeck, 1835) and by Becker (Nördingen, 1858). See Huss, John; Constance, Council of.

JERRARD, jĕr′ärd, George Birch (c.1803–63). A British mathematician, son of a major general. He studied at Trinity College, Dublin, graduating B.A. in 1827. His *Mathematical Treatises* (1832–35) and *Essay on Resolution of Equations* (1859) marked him as the predecessor of Cayley and Cockle among English writers on the theory of equations.

JERROLD, jĕr′old, Douglas William (1803–57). An English humorist, born in London. Though Douglas was sent to school, he mostly educated himself, reading, as time went on, Latin, French, Italian, and the English dramatists. From time to time as a boy he appeared on the stage. He took a child's part in *The Stranger,* and acted in *The Painter of Ghent* in 1835, and played Master Stephen in *Every Man in his Humour* in 1845; but he disliked acting. In 1813 he was appointed midshipman in the royal navy. After the Napoleonic wars he found employment in London as a printer's apprentice and as compositor. After some success at dramatic criticism he began writing for the stage. His first comedy, *More Frightened than Hurt,* written in 1818, was well received at Sadler's Wells Theatre in 1821. *Beau Nash,* a three-act comedy dealing with the history of the gambler Richard Nash (q.v.), was played at the Haymarket and published in 1825. But his great success was *Black-Eyed Susan,* which ran for 300 nights at the Surrey Theatre in 1829. Thereafter he wrote many comedies and farces, among which are *Time Works Wonders* and *The Bubbles of a Day.* In the meantime he was contributing essays and sketches to the magazines, from which he made a collection, *Men of Character* (1838). In 1841 he joined the staff of *Punch,* where first appeared (1846) the popular *Caudle Lectures.* He became in 1852 editor of *Lloyd's Weekly* newspaper. Among his works are *The Story of a Feather* (1844) and *The Chronicles of Clovernook* (1846). Though not a great writer, Jerrold was one of the most brilliant wits of his time. Consult W. B. Jerrold, *Life and Remains of Douglas Jerrold* (London, 1859), and W. C. Jerrold, *Douglas Jerrold and Punch* (New York, 1911).

JERROLD, William Blanchard (1826–84). An English journalist and author, eldest son of Douglas Jerrold. He was born in London. He studied art and did some good work in illustration, but defective sight compelled him to abandon his profession for literature. On the death of his father, in 1857, he became editor of *Lloyd's Weekly,* a position that he held till his death. In this paper Jerrold advocated the interests of the working classes. During the Civil War in the United States he took the side of the North. He also had a leading hand in founding the International Copyright Association, of which he was president. He wrote four successful comedies and farces, of which the best known is *Cool as a Cucumber,* produced at the Lyceum Theatre in 1851. Of his several novels, *Up and Down in the World* (1863) was most read. Two solid works from his pen are *Life and Remains of Douglas Jerrold* (1859) and *Life of Napoleon III* (4 vols., 1874–82).

JER′SEY. The largest and southernmost of the Channel Islands (q.v.), lying 15 miles north of the French coast, 17 southeast of Guernsey, and 88 southeast of Portland Bill (Map: France, N., C 3). It is of oblong form, 11 miles long, 4 to 6 miles wide, with an area of 45 square miles. It has a bold and lofty northern coast, with picturesque rocky inlets, and slopes to the south, east, and west, where it is indented by large open, sandy bays. The interior is mostly table-land, well wooded, especially in the valleys along the many winding streams which intersect the island. Various fruits, potatoes, and tomatoes are important crops. Jersey is divided into 12 parishes. The principal town, Saint Helier (q.v.), is connected by rail with Gorey village and harbor on the east, dominated by the imposing mediæval castle of Mont Orgueil; and on the west with the small, neat town of Saint Aubin, the line also extending to the Corbière, the southwest extremity of the island, where is a notable lighthouse. A fine panoramic view of the island is obtained from La Hogue Bie, or Prince's Tower, a building raised on a prehistoric tumulus. Jersey is famous for its breed of cattle (cattle in 1911 numbered 12,031). The island gave its name to New Jersey in 1664. It is the seat of a United States consular agent. Pop., 1891, 54,518; 1901, 52,576; 1911, 51,898. Consult: Noury, *Géologie de Jersey* (Paris, 1887); Black, *Guide to the Channel Islands* (11th ed., London, 1902); G. F. Carey, *Channel Islands* (New York, 1904); J. E. Morris, *Channel Islands* (ib., 1911).

JERSEY, The. The hulk of a 64-gun vessel in Wallabout Bay, Brooklyn, used by the British as a prison ship during the Revolution. The ship was never cleaned and for seven years was a centre of disease. It held 1200 prisoners. During her use as a prison ship 11,000 are said to have died and been buried on the Brooklyn shore. In 1902 the sunken hulk was discovered during operations connected with the building of a dock on the spot. Consult T. Andros, *The Old Jersey Captive* (Boston, 1833), and *Recollections of the Jersey Prison-Ship from the Original Manuscript of Captain Thomas Dring, One of the Prisoners,* edited by H. B. Dawson (Morrisania, N. Y., 1865).

JERSEY BLUE. An American breed of large domestic fowls, having a bluish plumage. The breast and fluff are light blue; hackle and sickles, blue black; feet, dark blue. They are not popular, either as table fowls or as egg producers, but are hardy and easily kept.

JERSEY CATTLE. See Cattle.

JERSEY CITY. The second largest city of New Jersey, and the county seat of Hudson County; an important railroad terminal point and a commercial and manufacturing centre (Map: New Jersey, D 2). It is on the peninsula formed by the Hudson River on the east and the Hackensack River and Newark Bay on the west and is opposite New York City, connected by steam ferries and the passenger tunnels of the Hudson and Manhattan Railroad. The Morris Canal has its eastern terminus in the city. The Central of New Jersey, the Erie, the Pennsylvania, the Lehigh Valley, and the West Shore railroads, whose depots are used by a number of other roads, also terminate here. The steamers of several transatlantic steamship companies sail from this port.

The city occupies an area of 12,288 acres and includes six small parks which comprise about 20 acres, and a new county park of 200 acres. It has good electric-railway service, the lines connecting with Newark, the Oranges, Rutherford, Passaic, Paterson, and towns in Hudson and Bergen counties. There are very few unpaved streets in Jersey City. Many of the avenues on the hill section back of the main portion are noteworthy for beautiful residences. In the western part of the city is the magnificent Hudson Boulevard, which extends through the entire length of Hudson County, 14 miles, and 5 miles into Bergen County. Since the completion of the Hudson tunnels this avenue is being filled with apartments. Among the more prominent buildings are the city hall, with a soldiers' and sailors' monument; the Fourth Regiment Armory; many new public schools; St. Francis, Christ, and city hospitals; a new post office; the public library, containing over 100,000 volumes; a courthouse erected in 1910 at a cost of $3,300,000; a historical museum, in which are preserved many Colonial documents of interest; and the People's Palace, a nonsectarian amusement institution built by Joseph Milbank and presented to the First Congregational Church. St. Peter's College (Roman Catholic), opened in 1878 and at present attended by about 450 students, is a well-known institution of learning. Besides 15 parochial schools, which provide for 12,500 pupils, there are in the city 34 public elementary schools and 2 high schools with accommodations for 38,000 pupils and having a property valuation of $5,800,000. There are several convents and a full equipment of asylums, homes, and other charitable institutions.

Jersey City is almost inclosed by water, thus affording excellent docking facilities, which, with its railroad connections, have aided its development as a shipping and receiving point, though officially it has no identity as a separate port, since its returns are included in those of the customs district of New York. It has also large slaughtering and meat-packing interests and extensive manufactures. The Pennsylvania and Erie railroads have large grain elevators here, and there are plants of the American Sugar Refining Company, Colgate and Company, and the Lorillard tobacco factories, which rank with the largest. Among products of other industrial establishments are candles, crucibles, lead pencils, patent iron dump carts, gas engines, compressed gas, glass, locomotives, railroad cars, iron and steel, zinc, copper, boilers, planing mill, foundry and machine-shop products, chemicals, paints, paper boxes, canned soups, motion-picture films, cordage, oakum, jewelry, and pottery.

Jersey City was the first large city in the East to institute a commission form of government, which in 1913 superseded the former administration. It was adopted in April, 1913, and the first primary election was held in May. The number of persons desiring office was reduced to 10, and in the final election, held in June, five commissioners were chosen. These then assumed the control of the municipal government. They are elected for four years, and one of their number is chosen mayor. He receives a salary of $5500. The other four members of the commission are paid $5000 a year. They are known as the commissioners of public safety, of streets and public improvements, of revenue and finance, and of parks and property. These men have legislative as well as executive power, and the laws made by them are known as ordinances. The board of education consists of 13 members, one from each city ward and one at large, appointed by the executive. The city appropriated, in 1914, $3,707,500, of which $273,000 went to the department of public affairs, $82,000 to revenue and finance, $551,000 to streets and public improvements, $1,306,000 to public safety, $183,000 to parks and public property, $549,907 for schools, and $19,000 for the municipal law department.

Pop., 1850, 6856; 1900, 206,433; 1905, 232,699; 1910, 267,779; 1914 (U. S. est.), 293,921.

In 1638 Abraham Isaacson Planck, a Dutchman, bought the land on which Jersey City stands. Later it passed into the hands of another Dutchman, Michael Pauw, and from him the old name Paulus Hoeck, or Hook, was derived. In 1776 fortifications were thrown up here by the Americans, but were captured later in the year (September) by the British. On Aug. 19, 1779, Lieut. Col. Henry Lee, "Light Horse Harry," with about 200 men, surprised the English garrison, and, with a loss of only two killed and three wounded, secured 159 prisoners, partially destroyed the works, and returned in safety. The exploit is regarded as one of the most brilliant feats of the Revolution. The British retook the place and remained in possession until the close of the war. In 1804 a town was laid out and incorporated as the city of Jersey. In 1820 it was reincorporated, this time as Jersey City, but did not become a distinct municipality until 1838. Bergen and Hudson were annexed in 1869 and Greenville in 1873, and a new charter was secured in 1889. Consult: S. A. Green, "Capture of Paulus Hook," in *Historical Magazine*, vol. iv (2d ser., Morrisania, N. Y., 1868); Alexander McLean, *History of Jersey City* (Jersey City, 1895); H. P. Eaton, *Jersey City and its Historic Sites* (ib., 1899); W. G. Muirheid (ed.), *Jersey City of To-Day* (2d ed., ib., 1910); Daniel Van Winkle, "Powles Hoek and Old Jersey City," in Historical Society of Hudson County *Papers*, No. 9 (ib., 1913).

JERSEY SHORE. A borough in Lycoming Co., Pa., on the Susquehanna River, 15 miles west by south of Williamsport, on the New York Central and Hudson River and the Pennsylvania railroads (Map: Pennsylvania, G 4). It is located in a farming district and has railroad shops, cigar factories, a foundry, and a large silk mill. Pop., 1900, 3070; 1910, 5381.

JER′SEYVILLE. A city and the county seat of Jersey Co., Ill., 66 miles southwest of Springfield, on the Chicago, Peoria, and St. Louis and the Chicago and Alton railroads (Map: Illinois, D 7). It has a Carnegie library and a fine courthouse. The county fair grounds are located here. The city is the centre of a fertile agricultural region, carries on a considerable trade in produce, fruit, grain, live stock, etc., and has manufactories of shoes. Settled in 1839, it was first incorporated in 1867. The government is administered under a revised charter of 1897, which provides for a mayor, elected biennially, and a council. Jerseyville owns its water works. Pop., 1900, 3517; 1910, 4113.

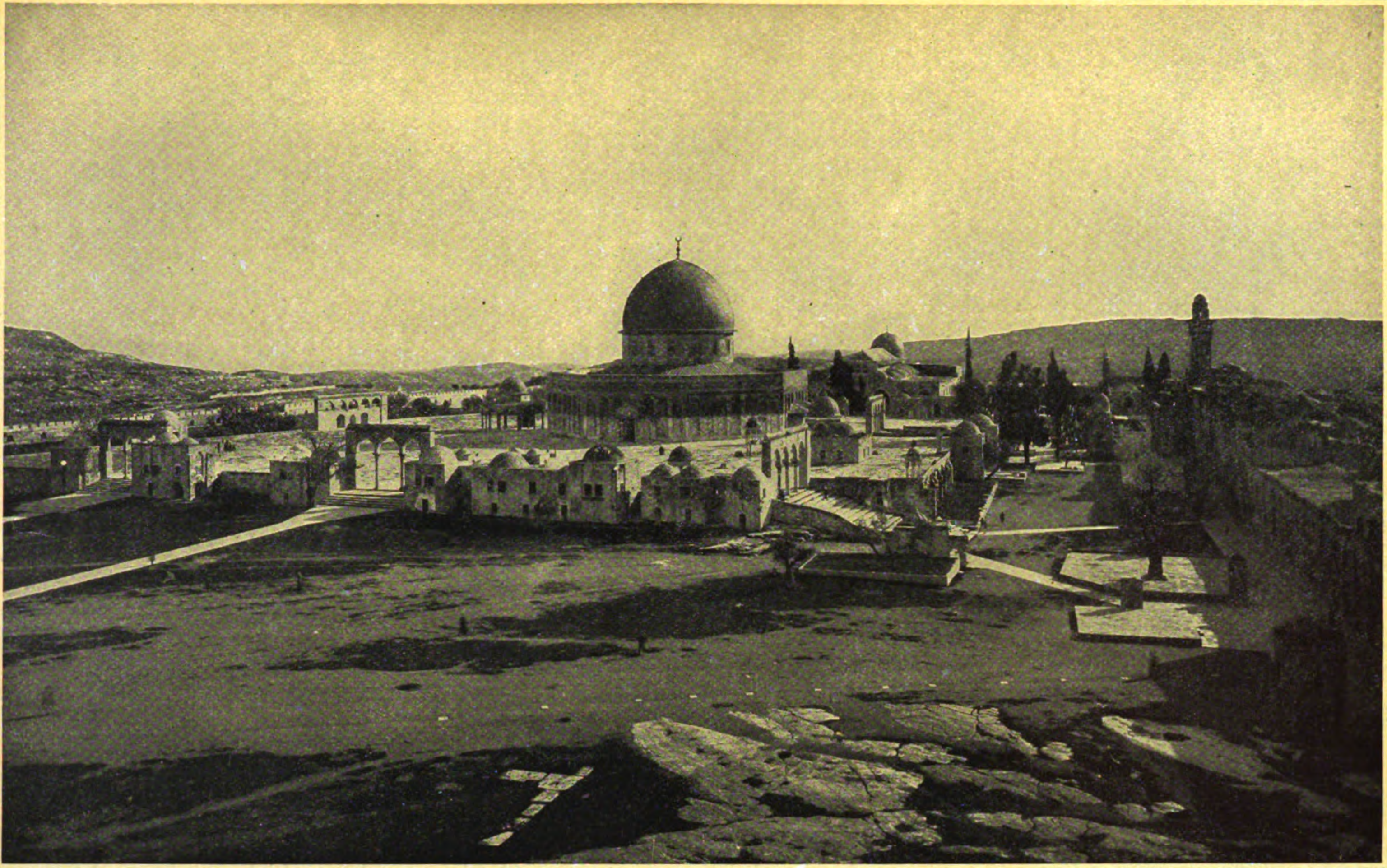
JERU′SALEM (Heb. *Yĕrûshâlayim*, Gk. Ἱερουσαλήμ, *Hierousalêm*, Lat. *Hierosolyma*). The chief city of Palestine (Map: Palestine, C 4). The name is of great antiquity, being found on seven of the Tell el-Amarna letters written by Abdi-chiba, ruler of the city, to his master, Amenophis IV of Egypt, c.1400 B.C. (See AMARNA LETTERS.) The original form as found on these tablets was *Urusalim*. On the inscriptions of the Assyrian kings it is spelled *Urusalimmu*. The meaning of the word is uncertain. In the early period of their occupation of Canaan the Hebrews also called it "the city of the Jebusites" or "Jebus" (Judg. xix. 10–11). The fortified part of the old Jebusite city was also called Zion (cf. 2 Sam. v. 7). The city rebuilt on the old site by the Emperor Hadrian (136 A.D.) was named by him Ælia Capitolina, but the ancient name continued in use. The Mohammedans call it el-Kuds (the holy). See special map with PALESTINE.

The Modern City. The dome of the church of the Holy Sepulchre is located in lat. 31° 46′ 45″ N., long. 35° 13′ 25″ E. The city is distant 33 miles from the Mediterranean and 15 miles from the northern end of the Dead Sea. It is situated on a spur from the main ridge or watershed of Palestine, which runs out eastward for a mile and a half and then deflects to the south for nearly the same distance. On three sides—east, south, and southwest—the city is bounded by deep ravines. The plateau thus formed was originally broken by minor valleys and hills. The highest summit was at the southwest angle. Between this broad western hill and the eastern part of the spur was a valley—the Tyropœon (i.e., the cheese makers). The eastern hill, with several distinct summits, was somewhat long and narrow, sinking rapidly at its southern end. The three valleys, the Kidron on the east, the Tyropœon in the middle, and that of Hinnom on the south and west of the western hill, unite south of the city. At their junction the elevation is about 2000 feet above the sea. The summit of the western hill is over 2500 feet above sea level, that of the eastern somewhat less. For its water supply Jerusalem depends mainly on artificial pools to which water is brought from a distance or on cisterns which conserve the water of the rainy season. The only perennial spring is the Virgin's Fountain, called Gihon in the Old Testament, located in the Kidron valley about one-third of a mile north of the junction of the three valleys. At the junction there is another spring, Bir Eyub (Job's well), called En Rogel in the Old Testament, which, however, is supplied by the surface drainage of the valleys and fails during the dry season of the year. The upper portion of the Tyropœon and several minor ravines are now almost entirely obliterated by the accumulated rubbish of 3000 years' checkered history. The climate of the city is not unhealthful, but the unsatisfactory sanitary conditions produce frequent outbreaks of fever and other epidemics. The mean annual temperature is about 62°, the extremes being 25° and 112°. The annual rainfall averages a little over 23 inches. The Jerusalem of to-day is surrounded by a long and tortuous wall, built by Soliman the Magnificent in the first half of the sixteenth century and practically coinciding with the fortifications of the city at the time of the Crusades. The wall is surmounted by 38 towers and is pierced by eight gates, of which the most important are the Jaffa Gate on the west, the Damascus Gate on the north, and the newly opened Gate of Abd-ul-Hamid, a short distance north of the Jaffa Gate. The inner city is divided into four parts. The Mohammedans occupy the northeastern and largest portion adjoining the Haram esh-Sherif; the Armenians live in the southwest, the Jews in the southeast, and the Christians in the northwest adjoining the outer city. The town is laid out irregularly, and the space is unequally distributed. The streets are narrow, tortuous, and dirty. The Jerusalem of the present, with its mercantile houses, hotels, stores, various educational and philanthropical institutions, has very little suggesting the city of the past. The historical interest of the city centres around the Haram esh-Sherif (the site of the temple; see TEMPLE AT JERUSALEM; OMAR, MOSQUE OF), the church of the Holy Sepulchre, and the Via Dolorosa (q.v.). Of the modern religious edifices may be mentioned the Latin patriarchal church, the German church of the Redeemer, the French church of Sainte-Anne, the Coptic and the Franciscan monasteries, and the Armenian patriarchal buildings. The outer town, which has grown up since 1858 to the northwest of the old city, contains many Christian churches and hospices, hospitals, schools, missions, and monasteries, as well as consulates and many private residences. In the neighborhood are a number of Jewish colonies. In regard to sanitary conditions the outer city is not above Jerusalem proper. The city is connected by carriage roads with Jaffa, Bethlehem, Hebron, and Jericho, and by a narrow-gauge railway line (54 miles), operated by a French company, with Jaffa. The chief industry of Jerusalem is the manufacture of articles from olive wood and mother-of-pearl. The trade is chiefly in the hands of the Jews. Administratively the city is the capital of a sanjak and has two councils, in which the recognized religious communities are represented. Jerusalem is the seat of a Roman Catholic, a Greek Catholic, and an Armenian patriarch, an Anglican bishop, and numerous consuls. The permanent population, which has been increasing rapidly during recent years, is estimated at 50,000 to 60,000, of whom the Jews constitute over one-half, the Mohammedans exceeding 7000, and the Christians numbering over 10,000. The annual number of pilgrims and tourists is estimated at an average of 15,000.

The Ancient and Mediæval City. Of the history of Jerusalem up to the time of David very little is known. The notices in the Tell el-Amarna letters and the statement in Gen. xiv. 18 only show that it was a place of some importance long before the Hebrew occupation. The account of the conquest of the region south of Jerusalem by the tribe of Judah (Judg. i. 8, 21, in which verse 8 seems to be a late gloss, and verse 21 is to be corrected according to Josh. xv. 63) shows that the city was too strongly fortified to be taken. With this the other ancient reference (Judg. xix. 10–12) agrees. It remained a Jebusite city until its capture by David. Its King, Adoni Zedek, was captured, it is true, by Joshua at the battle of Makkedah (Josh. x. 5–26), but the city remained in the hands of the Canaanites.

When David became King over all Israel (2 Sam. v. 1 et seq.), he discerned the advantages of Jerusalem and determined to make it his capital and sanctuary. He succeeded in taking it from the Jebusites and at once set about improving and fortifying it as the seat of his kingdom (2 Sam. v. 6–12). Soon after he removed thither the ark of Jehovah from its obscurity at Kirjath-Jearim (2 Sam. vi; 1 Chron. xi. 4–9). On the basis of the description by Josephus (*Jewish War*, v, 4, 1) the long-current opinion has been that the citadel taken by David and the city which he walled and improved occupied the high southwestern hill. But excavations and discoveries of remains of old walls and other ancient structures during the past 40 years have resulted in the accumulation of a body of evidence which necessitates an entirely different view. This newer view alone agrees with the incidental topographical notices in the Old Testament. The citadel of the Jebusites was on Ophel, the southern part of the eastern hill, east of the Tyropœon valley.

JERUSALEM



THE MOSQUE OF OMAR AND THE HARAM ESH-SHERIF

Between it and the other summit to the north, which was later occupied by the temple, but was then used as a threshing floor (cf. 2 Sam. xxiv. 15–25; 1 Chron. xxi. 18–30; xxii. 1; 2 Chron. iii. 1), lay a depression, afterward gradually filled up by later building operations. It was thus isolated on all sides. At the foot of its eastern slope was the only natural spring in the vicinity, anciently called Gihon (1 Kings i. 33, 38, 45; 2 Chron. xxxii. 30; xxxiii. 30), afterward named the Virgin's Fountain, while the surrounding hills and valleys were waterless. The slopes were steep and easily fortified. The exact location of David's palace and other buildings (cf. Neh. iii. 16) is not known, nor the extent of the fortifications built by him. This hill, originally called Zion, now became known also as the City of David. It is probable that the Tyropœon valley to the west and the southern and eastern slopes of the western hill were settled to some extent. David or Solomon may have thrown a wall (the first wall of Josephus' description) about these settlements, though no satisfactory evidence of this is at hand. This wall ran about due west from the southwest corner of the temple hill as far as the northwest corner of the southwestern hill; then, turning southward and swinging around the southern slopes of this hill, it crossed over to the south of Ophel, there joining the fortifications of the City of David. The chief feature of David's fortifications was Millo (literally "filling," probably a rampart or embankment constructed by filling in between retaining walls), often mentioned, but not yet identified.

What David began his son Solomon enlarged. On the hill north of the somewhat small and unpretentious palace of David he built a series of buildings on a scale of magnificence hitherto unknown in Israel. After the necessary leveling of the surface, which involved the partial filling up of the depression between Zion and the northern hill, and the laying of the substructures, especially heavy retaining walls on the south, west, and east faces of the north hill, Solomon built (1) a new royal palace with its adjuncts and (2) a sanctuary or temple. The palace was a complex of buildings consisting of the house of the forest of Lebanon, constructed of cedar pillars and beams, 50 cubits wide, 100 long, and 30 high, a throne hall, 30 ×50 cubits, with porticoes, and the palace proper or royal dwelling; somewhere near were apartments built for his Egyptian queen and also the prison (1 Kings vii. 1–12; Jer. xxxii. 2; Neh. iii. 25–27). These buildings were arranged in the order given from south to north, the house of the forest of Lebanon being nearest David's old palace, the royal dwelling being nearest the temple. They were not all on the same level, but were on successive terraces, the palace occupying the highest. On a still higher elevation than the palace were the courts and buildings of the temple. The temple (see 1 Kings vi and vii. 13–50) was built on the site of the threshing floor of Araunah (1 Chron. xxii. 1). The main building was of great beauty, though comparatively small (20 × 60 cubits, exclusive of the vestibule or porch and the side chambers, 1 Kings vi. 3–6), of stone and cedar. At the entrance stood two large bronze pillars of symbolic significance (1 Kings vii. 15–22). It was surrounded by a court in which were the altar of burnt offerings and the great molten sea or reservoir (1 Kings vii. 9–12, 23–47). A passageway led from the court to the palace below (2 Kings xi. 13, 16; xvi. 18). At the dedication of the temple the ark was "brought up" from the City of David (1 Kings viii. 1, 3; cf. ix. 24) to the new sanctuary. To the temple mount, now considered the dwelling place of Yahwe, Israel's God, the name Zion was transferred (cf. Amos i. 2; Mic. iv. 2; Isa. viii. 18, etc.). The temple and palace area were encircled by a strong wall. The city of Solomon was thus larger and more magnificent than that of David. The great buildings and main fortifications were still mostly, if not entirely, on the eastern hills. Thence the city gradually spread westward, covering the slopes of the Tyropœon valley and the western hills. With the secession of the northern tribes from the rule of the house of David (c.933 B.C.) Jerusalem's importance was diminished. For nearly two centuries it was barely able to hold its own. It was captured several times, and not until the prosperous reigns of Uzziah and his son Jotham (2 Chron. xxvi, xxvii) were extensive improvements undertaken. They greatly strengthened the fortifications by building strong towers near the gates and at the corners of the wall. Hezekiah (c.720–689 B.C.), having rebelled against Sennacherib, King of Assyria, and realizing that his capital was likely to be besieged by the Assyrian invaders, paid especial attention to the fortifications and the water supply. In place of the extramural surface conduit that conducted the waters of Gihon along the eastern and then across to the western side of Ophel he had an underground conduit tunneled a distance of 1700 feet to convey the water of Gihon to the Pool (or reservoir) of Siloam, on the southwest slope of Ophel, near the mouth of the Tyropœon valley. This conduit was discovered in 1886 by Dr. Schick. An old Hebrew inscription on the wall of the tunnel about 25 feet from the Pool of Siloam tells of the meeting of the two parties of workmen working towards each other in constructing the tunnel. (See SILOAM.) The pool was hewn out of the rock and measured 71 feet north and south by 75 feet east and west. Stone steps led down to it. Lower down the valley Hezekiah constructed a new reservoir to hold the overflow of Siloam. Walls and fortifications for the protection of these works were also erected (cf. Isa. xxii. 7–11; 2 Kings xx. 20; 2 Chron. xxxii. 5; 2 Kings xxv. 4). Doubtless the city by this time contained also numerous cisterns for holding surface water. The surplus waters of Siloam were used for the royal gardens about the southern slope of Ophel. Sennacherib did not lay regular siege to Jerusalem, and for nearly 100 years after Hezekiah the city was in comparative peace. Samaria had been captured in 722 B.C., and Jerusalem was now without a rival in Palestine, though Judah was but a vassal state of the Assyrian Empire. The city grew; in the reign of Josiah (639–608 B.C.) we read of a "second quarter" of the town (2 Kings xxii. 14; Zeph. i. 10), and the mention of numerous gates in Jeremiah and in Nehemiah's account of his reconstruction of the old walls makes it likely that by the time of the capture by Nebuchadnezzar the city wall inclosed the "second quarter" as well as the southwestern and eastern hills. This wall, perhaps begun by Hezekiah (see above), probably extended westward from the temple area, which was already well fortified, along the line of Josephus' second wall

(*Jewish War*, v, 4, 2). After submitting to Nebuchadnezzar (597 B.C.), the city rebelled and in 587–586 sustained a long and terrible siege of one year, five months, and seven days. On its capture the temple was burned, the walls broken down, the city laid in ruins, and the best part of the population deported (2 Kings xxiv and xxv; also Jeremiah and Ezekiel, passim).

For 50 years the city was a desolation. In 536 B.C. Cyrus gave permission to the Jews in Babylonia to return to Palestine. Upward of 50,000 availed themselves of the opportunity. But as the royal decree had contained no permission to rebuild the city walls, the second temple, on the same site as the old one, but less pretentious, and completed about 516, was at first without walls (Ezra i–vi; see also Haggai and Zech. i–viii). No permanent success in walling the city that again began to grow up near the temple was achieved until the arrival of Nehemiah (c.445 B.C.) as royal governor. This energetic man retraced and rebuilt the old wall of preëxilic days in the remarkably short time of 52 days, putting the whole available population at work. The description contained in Neh. ii. 12–16 and iii is an invaluable source for the topography of the old city, but details must be omitted here. The city area thus walled in being sparsely inhabited, Nehemiah persuaded many to take up their residence there (xi. 1 et seq.). The adoption of Ezra's "book of the law," corresponding practically to the "priestly" portion of the Pentateuch, as the constitution of the community completed the transition from the old Hebrew religion to Judaism, and of Judaism Jerusalem now became the head. Foreigners were, as far as possible, excluded from citizenship. (See Ezra ix–x and Neh. ix–xiii.) In Nehemiah's restoration the old palaces of the preëxilic city were not rebuilt.

From Nehemiah to Alexander's conquest of the East, Jerusalem enjoyed a century of quiet prosperity under Persian rule. Whether the conqueror visited the city is doubtful. For 100 years after Alexander, Jerusalem was subject to Egypt, and though Ptolemy I is said to have worked some devastation (Josephus, *Ant.*, xii, 1), this century was one of prosperity. The high priest Simon II (c.220–200 B.C.) was an able ruler and did much to improve the city (see Ecclus. l. 1–4). In 197 B.C. Jerusalem passed to the control of the Græco-Syrian Kingdom of Antioch. The growth of a liberal Hellenistic party in Jerusalem and the opposition it stirred up led to troublous times. At the accession of Antiochus IV Epiphanes (175 B.C.), Jason, a member of the pro-Greek party, was appointed high priest, and a gymnasium was erected in Jerusalem. These measures enraged the conservative element, and so bitter was the opposition that Antiochus IV in 168 B.C. determined to put an end to the Jewish faith. Great massacres took place in Jerusalem, the walls were broken down, a strong fortress, called the Akra, built on the site of the old City of David, was filled with a Syrian garrison, and finally, in December, 168, the temple was defiled, the altar polluted by sacrifice of swine and by the erection thereon of an altar (or statue) to Jupiter. This was the "abomination of desolation" (cf. Dan. xi. 31; 1 Macc. i; 2 Macc. iii–vii; and Josephus, *Ant.*, xii, 5, 1–4). After the first victories of Judas Maccabæus, a priest of a family called Hasmonæan, and his brothers, the temple was purified, worship restored (165 B.C.), and the temple hill strongly fortified. In 142 B.C. the Syrian garrison evacuated the Akra, or fortress of the City of David, south of the temple (1 Macc. xiii. 49–53). The Jews, under the leadership of Simon Maccabæus, now restored and greatly strengthened the old walls (1 Macc. xiv. 37). One great change was wrought by Simon in the general appearance of the city. The hill on which the old City of David had stood was leveled and greatly reduced in height so as to make the temple hill command the whole eastern part of the city. The result was that the depression between the two eastern hills was now entirely filled up, and its existence was soon entirely forgotten (Josephus, *Jewish War*, v, 4, 1, according to the correct interpretation).

Under the Hasmonæans Jerusalem entered on an unprecedented era of prosperity. It was now the great pilgrim shrine of the Jewish world. A palace was built on the hills west of the temple mount, the Tyropœon valley being bridged to permit of easy access to the temple. The tower of Hammeah (Neh. iii. 1) northwest of the temple was also greatly strengthened. The capture of the city by Pompey (63 B.C.) entailed no serious disaster. The acme of prosperity was attained under Herod the Great (37 B.C.). Besides a complete reconstruction of the temple on a scale truly magnificent, involving the expenditure of vast sums of money, he built the Xystus, an open place surrounded by a gallery beneath the palace of the Hasmonæans, his own great palace on the western side of the western hill, with its three massive towers Phasael, Hippicus, and Mariamne, the large reservoir Amygdalon north of the palace, a hippodrome probably south of the temple mount, and a theatre somewhere in the south part of the city. In addition to these great works many minor improvements were made, such as paving, draining, leveling, and the general strengthening of the fortifications. Other improvements were undertaken after Herod's day, such as the palaces built by the royal family of Adiabene on the southern extension of the temple hill (Josephus, *Jewish War*, iv, 9, 11; v, 6, 1; vi, 6, 3), the enlargement of the Hasmonæan palace by Agrippa II in 62 A.D. (Josephus, *Ant.*, xx, 8, 11), and the third wall, begun by Agrippa I (41–44 A.D.), completed shortly before the siege by the Romans, rendered necessary by the growth of the city to the northwest and north. Such was the Jerusalem of New Testament times. According to Josephus, the different quarters of the city were known as (1) the upper city, i.e., the high southwest hill; (2) the temple area; (3) the lower city or Akra, the portion of the eastern hill south of the temple hill; (4) the new city, or Bezetha, i.e., the quarter north of the temple hill; and (5) the northern quarter, i.e., north of the old (first) wall and west of the temple (cf. Josephus, *Jewish War*, v, 4, 1).

This city, with its beautiful palaces and more beautiful temple, was laid in ruins in the terrible siege and capture by the Romans under Titus in 70 A.D. (cf. Josephus, *Jewish War*, books v, vi, and vii, 1, 1). Only a few remnants of the western fortifications were left standing. With this catastrophe the history of ancient Jerusalem came to its close.

The History and Topography of Modern Jerusalem. For 60 years Jerusalem was practically in ruins. About 130 the Emperor Hadrian visited it and determined to rebuild it. The desperate rebellion of the Jews under Bar Cochba led him to make it a pagan city and prohibit all Jews from entering it. The new city was called Ælia Capitolina. The wall with which Hadrian encircled it was, in general, on the line of the old wall, except on the south, where it left a large portion of the old city, including the whole of the City of David, outside the inclosure. The rebuilding caused a great change in the levels, owing to the vast accumulation of rubbish rendering the whole surface more uniform than that of the old city had been. In some places the former city was buried to a depth of 80 feet, making identifications of many ancient places uncertain, if not impossible.

Nothing is known of the city from Hadrian to Constantine the Great. The pagan population was gradually supplemented by Christians. With the recognition of Christianity as the religion of the Empire, pilgrims began to flock to Jerusalem to visit the holy places. The church of the Holy Sepulchre (see HOLY SEPULCHRE) was built by Constantine's orders. Other buildings of like character were added as the centuries went by. Jerusalem became a Christian city, the favorite resort of religious devotees from all quarters of Christendom. Among the noteworthy buildings belonging to this period the church of St. Stephen, north of the city, built by the Empress Eudocia (450–460), who also rebuilt the ancient southern wall, and the great church of St. Mary on the temple hill, built by Justinian c.532, deserve mention.

The Christian city, after being captured by the Persians under Khosru in 614, but recovered by the Emperor Heraclius in 628, was taken by the Moslems in 637 under the Caliph Omar. The Christians were treated leniently. A mosque, The Dome of the Rock, was erected about 691 by the Caliph Abd-al Malik over the rock which, in all probability, was the altar place of Solomon's temple. When in 969 the Egyptian Fatimite caliphs became rulers of Jerusalem, the condition of the Christian population became more serious. The Seljuk Turks conquered the city in 1077, and their maltreatment of Christians was one of the chief causes of the Crusades. In 1099 the Crusaders, under Godfrey of Bouillon and others, gained possession of the city. Moslems and Jews were severely treated. Jerusalem was once more a Christian city. The churchmen of the crusading forces immediately set about the election of a patriarch, probably expecting the temporal dominion to go with the spiritual, but the secular princes insisted on the choice of a king. The crown was declined by Raymond of Toulouse, and possibly also by Robert of Normandy. Godfrey of Bouillon was the final choice, though he refused to wear "a crown of gold in the place where his Saviour had worn a crown of thorns," and called himself simply protector of the Holy Sepulchre. The new state won its first victory at Ascalon a few days later and was soon fully organized with Western laws. Godfrey died in a year and was succeeded by his brother Baldwin, Count of Edessa. He succeeded in enlarging his kingdom by the conquest of Arsuf and Cæsarea in 1101, of Acre (Ptolemais) in 1104, of Tripolis in 1109, and of Berytus and Sidon in 1110. The other Christian lordships of the East acknowledged him definitely as their suzerain. He died on his way back from an expedition against Egypt in 1118, designating as his successor his brother Eustache, or, failing him, his cousin Baldwin of Edessa. The latter being on the spot, the barons decided to avoid an interregnum by crowning him at once. Baldwin II also extended the boundaries of his kingdom. In 1124, with Venetian aid, he made the important conquest of Tyre. His reign was a constant series of conflicts, but before his death, in 1131, the Kingdom reached the height of its power. None the less its existence was precarious; the feudal system, which had been a help in its establishment, now tended to dissension, and under the next King, Fulk of Anjou (1131–43), the decline began. During the minority of Baldwin III (1143–62) Edessa was conquered and destroyed, 30,000 Christians being slaughtered. The news of this disaster called out the Second Crusade, which did nothing to strengthen the Kingdom. Amalric (1162–73) attempted the conquest of Egypt, but was opposed by Saladin, who was now rising to supreme power among the Moslems. In the reign of Guy of Lusignan, whose title came through his wife, Sibylla, mother of Baldwin V, Saladin defeated the Christian army in the decisive battle of Tiberias and on Oct. 2, 1187, took Jerusalem and cast down the cross from the mosque of Omar. The titular kingship came in 1225 by marriage to the Emperor Frederick II, who secured possession of the city (except two mosques) by a treaty with the Sultan Kameel in 1229; but, owing to his conflict with the holy see, he was obliged to crown himself, not a single ecclesiastic being willing to sanction his title. In 1244 the city was stormed by the Kharezmians and passed finally out of Christian hands, and the fall of Acre in 1291 was the definite close of the real history of the Kingdom. The title of King of Jerusalem, however, was for a long time borne by the kings of Naples and Sicily, from whom it passed to the house of Lorraine and, by the marriage of Maria Theresa (1736), to the Hapsburgs. The Emperor Ferdinand I (1835–48) finally renounced it. For further details on the mediæval history, see CRUSADES, and consult the authorities there referred to.

Bibliography. For the antiquities of Jerusalem, consult the standard guidebooks, especially Baedeker's (4th ed., London, 1906) or Murray's (ib., 1892). Of the voluminous literature on the city, only the most recent and reliable is selected. The comprehensive articles by the expert witnesses—Guthe, in the Hauck-Herzog *Realencyclopädie*, vol. viii (3d ed., Leipzig, 1896–1913), G. A. and W. R. Smith, in the *Encyclopædia Biblica* (4 vols., New York, 1899–1903), and Conder, in Hastings, *Dictionary of the Bible* (ib., 1914)—are most excellent. *The Survey of Western Palestine, Jerusalem* (London, 1884), by Warren and Conder, contains the results of surveys and excavations up to 1883. The annual reports of the Palestine Exploration Fund (ib., 1883 to date) are invaluable, also the similar reports of the German Palestinian Society (Leipzig). Other publications of the Palestine Exploration Fund may be consulted, particularly Besant and Palmer, *Jerusalem, the City of Herod and Saladin* (4th ed., London, 1899); Conder, *The Latin Kingdom of Jerusalem, 1099–1291* (ib., 1884); and vol. i of the Palestine Pilgrims' Text Society (ib., 1887). For special monographs, consult: Warren, *Underground Jerusalem* (ib., 1876); Mommert,

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JERUSALEM, Assize of. See Assize of Jerusalem.

JERUSALEM, Councils of. A number of councils were held in Jerusalem, of which the following are the most important: 1. The first Christian council, often called the Apostolic Council (Acts xv. 1–31), was held about 51 A.D., to consider questions raised in the church of Antioch concerning the obligation of Gentile Christians to observe the Jewish law. By the decision of the council it was declared to be necessary for such Christians to abstain from (*a*) meats which had been offered to idols, (*b*) blood and strangled things, (*c*) fornication. This council seems to have comprised only one church, that in Jerusalem, though this church may have embraced several local congregations in that city, organized as a church in common. 2. In 335 a council, formed of the bishops who had assembled for the consecration of the church of the Holy Sepulchre, restored Arius to fellowship and allowed him to return to Alexandria. 3. About 346 Maximus, of Jerusalem, and 60 other bishops, on the return of Athanasius to Alexandria, revoked the decree against him and drew up a letter to his church. 4. In 399 a council held in consequence of a letter from Theophilus of Alexandria on the decree passed against the Origenists assented to it and resolved not to have fellowship with any who denied the equality of the Son with the Father. 5. In 553 the acts of the fifth Ecumenical Council (Constantinople) were received by all the bishops of Palestine assembled at Jerusalem, except Alexander of Abilene, who was consequently deposed. 6. The most important council held in Jerusalem was that of 1672. It was convened by Dositheus, Patriarch of Jerusalem, and was composed of more than 60 bishops and other officers in his diocese. Its object was to oppose Calvinism, which had been introduced into the East by Cyril Lucaris. Its measures led to its being charged with favoring Roman Catholicism and occasioned considerable trouble in the Church. See Greek Church.

JERUSALEM, Latin Kingdom of. See Latin Kingdom of Jerusalem.

JERUSALEM, Temple at. See Temple at Jerusalem.

JERUSALEM, yâ-rōō'zâ-lĕm, Wilhelm (1854–). An Austrian philosopher and psychologist. He was born in Drĕnic, Bohemia, was educated at Prague, specializing first in classical philology and then in pedagogy, and taught in secondary schools in Nikolsburg (1878–85) and Vienna (1885–1907) and then became lecturer in the University of Vienna. Among his valuable works covering various branches of philosophical study are: *Zur Reform der philosophischen Propädeutik* (1885); *Psychologische Sprachbetrachtung* (1887); *Lehrbuch der empirischen Psychologie* (1888; 5th ed., 1912); *Laura Bridgman* (1890); *Die Urteilsfunktion* (1895), an excellent summary of different theories of the nature of the logical "judgment"; *Einleitung in die Philosophie* (1899; 6th ed., 1913), which has been translated into English (1910), Russian, Polish, and Japanese; *Der kritische Idealismus und die reine Logik* (1905); *Gedanken und Denker* (1905); a translation (1908) of William James's *Pragmatism; Die Soziologie des Erkennens in der Zukunft* (1909).

JERUSALEM ARTICHOKE. See Araucaria; Artichoke.

JERUSALEM CHAMBER. A room adjacent to Westminster Abbey, built in 1376–86, so named from tapestries formerly hung there and representing scenes from the history of Jerusalem. It is now the meeting place of the Upper House of Convocation of the Province of Canterbury. The room contains frescoes of the death of Henry IV, who died in it, and of the coronation of Queen Victoria.

JERUSALEM CHERRY. The popular name of an ornamental species of the genus *Solanum*, of which *Solanum pseudocapsicum* and its hybrids are the most important species. As grown under glass for decorative purposes, it ranges from 1 to 3 feet in height, carrying numerous bright-green oblanceolate or oblong short-petioled leaves, small white flowers, and a profusion of bright red or yellow fruits about ½ inch in diameter, which constitute the chief beauty of the plant. It is easily propagated either by seeds or cuttings.

JERUSALEM CORN. A variety of nonsaccharine sorghum. See Andropogon; Sorghum, *Nonsaccharine*.

JERUSALEM CREED. A confession of faith taught by Cyril of Jerusalem in his catechetical lectures before 350. It is preserved as follows in Cyril's discourses: "I believe in one God, the Father Almighty, maker of heaven and earth, and of all things visible and invisible; and in one Lord Jesus Christ, the only begotten Son of God, begotten of the Father before all worlds, very God, by whom all things were made, who was incarnate and made man, crucified and buried, and the third day ascended into the heavens, and sat down at the right hand of the Father; and is coming to judge quick and dead. And in the Holy Ghost, the paraclete, who spake by the prophets; and in one baptism for the remission of sins; and in one holy catholic church; and resurrection of the flesh; and in life everlasting." It is of great historical interest, as being the basis of the Constantinopolitan creed of 381. Consult Schaff, *Creeds of Christendom*, vol. ii (New York, 1878), and Curtis, *History of Creeds and Confessions* (Edinburgh, 1911). See Nicene Creed; Creeds and Confessions.

JERUSALEM DELIVERED. See Gerusalemme Liberata.

JERUSALEM OAK. An herb of southern Europe. See Chenopodium.

JERVIS, jĕr'vĭs *or* jär'vĭs, John, Earl of St.

VINCENT (1735–1823). A British admiral. The second son of Swynfen Jervis, barrister, he was born at Meaford, Staffordshire, Jan. 9, 1735. After education at Burton-on-Trent and at Greenwich, he entered the navy in 1749. He obtained a commission as lieutenant in 1755, and during some years was engaged in active service on the North American station. In 1769 he commanded the *Alarm* frigate in the Mediterranean, and when it was paid off made a tour of inspection of the naval arsenals of France and northern Europe. His next command was the *Foudroyant*, of 80 guns, the finest two-deck ship in the British navy. Engaging the *Pégase*, 74 guns, off Brest, in 1782, he took her without the loss of a man. In 1783 he entered Parliament for Launceston. In 1787 he was made rear admiral and in 1793 commanded the naval part of the expedition against the West India Islands, Sir C. Grey commanding the troops. Although the French were well prepared and fought desperately, every island fell in succession into the hands of the British. In 1795 he was made an admiral and given the command of the Mediterranean fleet. On Feb. 14, 1797, with 15 sail of the line, he encountered the Spanish fleet of 27 sail off Cape St. Vincent, and the battle of St. Vincent was fought. The genius of Nelson contributed greatly to the success of the day. For this victory the King created Jervis Earl of St. Vincent, and Parliament settled upon him a pension of £3000 a year. After having by great firmness repressed a mutiny off Cadiz, which threatened the loss of the whole fleet, he was compelled by ill health to return home. He was soon applied to by government to subdue the spirit of sedition which had openly manifested itself in the Channel fleet, and his endeavors were eminently successful. After having held the appointment of First Lord of the Admiralty (1801–03) and at the age of 72 for a second time commanded the Channel fleet, he retired into private life, and died March 13, 1823. A public monument was erected to his memory in St. Paul's Cathedral. St. Vincent ranks among the foremost naval commanders who broke the maritime power of France and Spain and established the naval supremacy of Great Britain. Consult Brenton, *Life and Correspondence of John, Earl of St. Vincent* (London, 1838), and Tucker, *Memoirs of . . . the Earl of St. Vincent* (ib., 1844). But these books have been largely superseded by Laughton, *From Howard to Nelson* (ib., 1899); A. T. Mahan, *Types of Naval Heroes* (Boston, 1901); Anson, *Life of John Jervis, Admiral Lord St. Vincent* (London, 1913).

JERVIS, jĕr′vĭs, JOHN BLOOMFIELD (1795–1885). An American civil engineer. He was born at Huntington, Long Island, and was brought up at Rome, N. Y. After receiving a common-school education he began work on the Erie Canal, was promoted in two years from axeman to resident engineer in charge of 17 miles of the canal, and in 1824 was in control of one-seventh of the canal. In the following year he became assistant engineer of the Delaware and Hudson Canal Company, in 1830 became chief engineer of the Albany and Schenectady Railroad, and in 1836, after taking a prominent part in the enlargement of the Erie Canal, began the work of constructing the Croton Aqueduct. The Cochituate Aqueduct (Boston) and the Hudson River Railroad between New York and Albany were constructed largely from his plans and under his supervision. He retired in 1858 from the presidency of the Rock Island, but after three years was chosen superintendent of the Pittsburgh, Fort Wayne, and Chicago Railroad, and in two years brought its stock up from a value of eight cents on the dollar to a point where it paid a dividend of 10 per cent. He received the degree of LL.D. from Hamilton College in 1878. Port Jervis, N. Y., was named in his honor. He wrote: *Railway Property* (1859); *The Construction and Management of Railways* (1861); *Labor and Capital* (1877).

JERVOIS, jĕr′vĭs, SIR WILLIAM FRANCIS DRUMMOND (1821–97). An English soldier and engineer, born at Cowes, Isle of Wight. After early education at Gosport and Woolwich he entered the Royal Military Academy at Woolwich in 1837 and two years later received a commission in the Royal Engineers. In 1841 he proceeded to the Cape of Good Hope and for seven years was engaged in professional duties, besides being employed in active service against the Boers and Kaffirs. He returned to England in 1848; continued on active engineering duty; received various promotions; and in 1856, when commanding royal engineer of the London Military District, was appointed assistant inspector general of fortifications. In 1857, during the threatened war with France, he was made secretary of the National Defense Committee. His report and recommendations for the defenses of London and the nation were accepted by Parliament and carried into effect. In 1862 he was appointed director of works for fortifications and in 1864 and 1865 inspected the fortifications of Canada and its eastern seaboard, also visiting the principal Eastern forts of the United States during the Civil War. Until 1874 he was actively engaged at home and in the colonies—Halifax, Bermuda, Gibraltar, Malta, and India—superintending the execution of a system of Imperial defense. Jervois saved £40,000 on the sum of £7,460,000 which had been voted for defense. From 1875 to 1877 he was Governor of the Straits Settlements; from 1878, when he was made G.C.M.G., to 1882 he was Governor of South Australia; and from 1882 to 1889 was Governor of New Zealand. In all these positions he distinguished himself by his ability and energy and was notably popular. Some of his papers on the coast defenses of England and the colonies and on England's defensive policy were separately published.

JESH′URUN (Heb. *Yeshurûn*). A poetical or symbolical name for Israel, used three times in Deuteronomy (xxxii. 15; xxxiii. 5, 26) and once in Isaiah (xliv. 2). The underlying root of the word, *yashar*, denotes "straight, upright," and it seems to be a formation designed as a symbolical play upon Israel, artificially separated into two elements, *yshr* (= *yashar*) and *el*.

JESI, yā′zē, or **IESI** (Lat. *Æsis, Æsium*). An episcopal city in the Province of Ancona, Italy, 17 miles by rail southwest of the city of Ancona, on a hill beside the river Esino (Map: Italy, D 3). It has mediæval walls, a cathedral dedicated to the martyr St. Septimius, the first Bishop of Jesi (308), and the twelfth-century church of San Marco. There is a fifteenth-century city hall, once the convent church San Floriano, and a library with paintings by Lorenzo Lotto. Jesi was the birthplace of Emperor Frederick II and of the composer Giovanni Pergolesi. The composer Spontini was born in a neighboring village. There are schools of music and design, a private female normal school, a gymnasium, several technical schools, and a seminary. The city manufactures paper, bricks, silk, wool, soap, matches, hats, and rope. As the city is an important centre of local trade, there are many fairs. Wine and oil are marketed here. The river Æsis (modern Esino) from 250 to 82 B.C. formed the northern boundary of Italy. The town of Æsis was a recruiting station for the Roman army. Pop. (commune), 1901, 22,308; 1911, 24,777.

JESPERSEN, yĕs′pĕr-sĕn, Jens Otto Harry (1860–). A Danish philologist, born at Randers. He studied law and languages at the University of Copenhagen, where, after gaining the degree of Ph.D., he became professor of English language and literature (1893). In his books Jespersen treats mainly of phonetics. His principal work is the large *Fonetik, Læren om Sproglyd* (1897–99), which is the first complete presentation of phonetics in Danish. Of the periodical *Dania* he, with Kr. Nyrop, was editor from 1890 to 1903. He wrote: *The Articulation of Speech Sounds* (Marburg, 1889); "Danias Lydskrift," in *Dania* (1890); "Til Spörgsmaalet om Lydlove," in *Nordisk Tidskrift for Filologi*, vol. vii (1886; in German, in *Internationale Zeitschrift für allgemeine Sprachwissenschaft*, vol. iii); *Chausers Liv og Digtning* (1893); *Progress in Language* (1894); *Sprogundervisning* (1901; Eng. trans., 1904); *Phonetische Grundfragen* (1904); *Growth and Structure of the English Language* (1905); *John Hart's Pronunciation of English* (1907); *Modern English Grammar* (1909); *Lehrbuch der Phonetik* (1913). In 1886 he helped found Quousque Tandem, a Scandinavian society for improved instruction in languages, and through various channels he exerted a large influence upon the teaching of languages in Denmark. Jespersen became vice president of the Association Phonétique Internationale, was elected officer or member of many other societies, Danish and foreign, and in 1906 was awarded the Volney prize of the French Institute. In 1904 he lectured at St. Louis and in 1909–10 at the University of California and Columbia University, where he was made honorary doctor.

JES′SAMINE. An ornamental shrub which bears fragrant flowers. See Jasmine.

JES′SAMY BRIDE, The. A name given to Mary Horneck, a relative of the artist Reynolds and supposed to have been the object of Goldsmith's affection. The word "jessamy" probably represents jasmine and is used to indicate the daintiness and grace of her person.

JES′SANT (probably from OF. *issant*, pres. p. of *isser*, *eisser*, *iesser*, to issue, from Lat. *exire*, to go out, from *ex*, out + *ire*, to go). In heraldry, a term frequently used as synonymous with *issuant*, rising, as a demilion is often represented doing, from the bottom line of a field or upper line of an ordinary. Jessant is sometimes used improperly for *naissant*, or rising from the middle of an ordinary. See Heraldry.

JESSE, Edward (1780–1868). An English writer on natural history, born at Hutton-Cranswick, Yorkshire. He early showed a love of plants and animals, fostered by his places of residence, Richmond and Bushey parks, and he should be credited with much that was done to beautify Hampton Court. He was made deputy surveyor of royal parks and palaces. Though he was no great scientist, there is pleasant reading in his *Gleanings in Natural History* (1832–35), *An Angler's Rambles* (1836), *Scenes and Tales of Country Life* (1844), *Anecdotes of Dogs* (1846), and *Lectures on Natural History* (1861), as well as his descriptions of jaunts to Hampton Court, Windsor, and Eton. He edited Walton's *Compleat Angler*, and White's *Selborne*, with a biographical introduction.

JESSE, John Heneage (1815–74). An English historical writer. He was educated at Eton and became an Admiralty clerk, but was devoted to literature early in life, and his first poem, "Mary Stuart," was published in 1831. He wrote *London: Its Celebrated Characters and Remarkable Places* (3 vols., 1871), but made a specialty of memoirs, of which *George the Third* (3 vols., 1867) was his best effort. The others include: *The Court of England during the Reign of the Stuarts* (1840); *The Court of England from the Revolution to the Death of George II* (3 vols., 1843); *George Selwyn and his Contemporaries* (4 vols., 1843); *The Pretenders and their Adherents* (2 vols., 1845); *Richard the Third and Some of his Contemporaries* (1862); *Celebrated Etonians* (2 vols., 1875). American editions of most of the above-mentioned memoirs appeared at the close of the last and the opening of the present century.

JESSE, Richard Henry (1853–). An American educator, born in Lancaster Co., Va. He studied at the University of Virginia (1873–75, 1878) and in Europe (1885, 1890, 1905–06). For some years he was connected with secondary schools as teacher or principal, from 1884 to 1891 he was professor of Latin at Tulane University, and thereafter until his retirement in 1908 was president of the University of Missouri, also holding the chair of ancient and mediæval history. At various times he served as president of the Missouri State Teachers' Association, the Southern Association of Colleges and Secondary Schools, the National Association of State Universities, and the Baptist Congress. In 1904 he was awarded a commemorative diploma and medal at the St. Louis Exposition for his services to education. He is author of *Missouri Literature* (1901), with E. A. Allen, and of papers in the transactions of various societies.

JESSEL, jĕs′el, Sir George (1824–83). An English judge, born in London. He was educated at University College, London, becoming a fellow in 1846, and in 1847 was called to the bar at Lincoln's Inn, becoming bencher in 1865. He was returned to Parliament for Dover in 1868, was appointed Solicitor-General in 1871, and in 1873 became Master of the Rolls and Privy Councilor. The second Judicature Act of 1881 relieved him of duty in the rolls court and made him president of the first court of appeal, and there he served until his death. Jessel was the first Jew to participate in the executive government of England, to sit on the judicial bench of Great Britain, and to become Privy Councilor. As a judge, he was noted for his comprehensive and accurate legal knowledge and for his dispatch.

JES′SICA. Shylock's beautiful daughter, in Shakespeare's *Merchant of Venice*.

JESSO, yĕs′sō. An island of Japan. See Yezo.

JESSONDA, yĕ-sŏn′dȧ. An opera by Spohr (q.v.), first produced in Cassel, July 28, 1823.

JES′SOPP, Augustus (1823–1914). An

English clergyman and author, born at Albury Place, Hertfordshire. He was educated at St. John's College, Cambridge, was select preacher at Oxford in 1896, and held honorary fellowships at both universities. He began his clerical life as curate of Papworth St. Agnes, Cambridgeshire (1848-54), but was head master in Helston Grammar School, Cornwall, for four years, and in a Norwich academy for 20 years, before he was made rector of Scarning, Dereham, Norfolk, in 1879. In charge of this parish he remained until 1911. From 1902 to 1910 Dr. Jessopp was chaplain in ordinary to King Edward VII. His literary work includes an edition, with life, of John Donne's *Essays in Divinity* (1855); *One Generation of a Norfolk House* (1878); *History of the Diocese of Norwich* (1879); *Arcady for Better for Worse* (1881); *The Coming of the Friars* (1888); *Trials of a Country Parson, Random Roaming,* and *Frivola* (all 1896); *Before the Great Pillage* (1901); and the biographies of Queen Elizabeth and some of the famous men of her time in the *Dictionary of National Biography.* In 1914 appeared *England's Peasantry, and Other Essays.*

JES'SUP, Henry Harris (1832-1910). An American Presbyterian missionary. He was born at Montrose, Pa., son of the jurist William Jessup (1797-1868); graduated at Yale in 1851 and at Union Theological Seminary in 1855; and immediately entered the foreign-missionary service of the Presbyterian church in Tripoli, Syria. In 1860 he was transferred to Beirut and became prominent at that important station. He wrote, besides various works for the American Mission Press at Beirut: *The Women of the Arabs* (1873); *The Mohammedan Missionary Problem* (1879); *The Greek Church and Protestant Missions* (1884); *Kamil, a Moslem Convert* (1899); *Fifty-Three Years in Syria* (1910).

JEST (OF. *geste,* exploit, tale of adventure, from ML. *gesta,* deed, from Lat. *gestus,* p.p. of *gerere,* to carry on). The word *geste,* meaning originally something done, a deed, an exploit, came to be a name for the record of exploits in history or story. It was so used in Middle English, but gradually came to assume its exclusive modern sense of a joke or piece of fun. A stage in the transition from story to humorous story and trick, and finally to witty saying, is marked by the geste of Robin Hood, narrating the shrewd practices of this outlaw and his merry men. Though the word in its modern sense is of comparatively recent date, the jest itself is of ancient origin. Collections of jests passed from the East to the Greeks, then to the Romans, and from classic literature spread throughout Europe in the Renaissance period, uniting with that stream of story and witty remark which flows from men of all races and of all times. The earliest of modern jest books, dating from the fifteenth century, were in Latin and were known as *facetiæ* (q.v.). A notable volume was the *Liber Facetiarum* (1470) of the Florentine Poggio, of which the best stories found their way into the anecdotal literature of Italy, France, Germany, and England. For Italy may be cited Pietro Aretino and the vast body of *novelle,* dealing with the incidents of everyday life; and for France the *contes* and *joyeux devis* of Rabelais and his school. Among the earliest German jest books were the Latin *Facetiæ* of H. Bebel (1508) and the *Schimpf und Ernst* of the monk Johannes Pauli (1519), largely compilations for which Poggio was freely used. Native German humor of the period is perhaps best seen in the Low Saxon *Eulenspiegel* (q.v.) (1515), which in a mutilated form early passed into France and England. Eulenspiegel (i.e., owlglass), from whom the book derives its name, is a knavish peasant who plays his tricks upon his more prosperous countrymen. In England there had long been books sharing in the literature of jest. Such, e.g., was the *De Nugis Curialium* (twelfth century) of Walter Map. But the flourishing period of the jest book in England, as in the rest of Europe, was during the sixteenth and seventeenth centuries. From the press of John Rastell issued two interesting collections—*The Merry Gests of the Widow Edith,* in verse (1525), and *The Hundred Merry Tales* (1526). The latter volume is mentioned by Beatrice in *Much Ado about Nothing* (II, i, 135). These were succeeded by *Merry Tales and Quick Answers* (about 1535), containing 114 anecdotes. It became customary for compilers to father their collections upon some well-known historical character who might or might not have been a wit. Famous books of this kind were: *The Merry Tales of Skelton* (1566 or 1567), attributed to John Skelton, who after his death gained the reputation of a wag; *The Jests of Scogan* (1565-66, probably), said to have been gathered by Andrew Boorde (q.v.), a witty physician, from the sayings of a fool at the court of Edward IV; *Tarlton's Jests* (3 parts, 1592, 1600, 1611), named from the great comedian; and *The Jests of George Peele* (1607), containing perhaps some escapades of the dramatist. This practice of placing a name on the title-page that would sell the book continued into the nineteenth century, receiving its most abused illustration in the collections purporting to have been "transcribed from the mouth of Joe Miller" (q.v.), an actor of the eighteenth century. *The Merry Tales of the Mad Men of Gotham,* dating from the sixteenth century, were given a habitation in Nottinghamshire. The little pamphlet circulated as a chapbook in England and Scotland well into the nineteenth century. Other collections are *Pasquil's Jests, Mixed with Mother Bunch's Merriments* (1604); *The Pleasant Conceits of Old Hobson, the Merry Londoner* (1607); and the racy *Wit and Mirth* of John Taylor (q.v.), the water poet. These books are only a small section of a vast literature of jest which pervaded popular tales and prepared the way for the realism of the modern novel. The jest was fused with the novel of manners by Theodore Hook (q.v.) in his *Sayings and Doings* (London, 1824-28). The older English jests were edited by W. C. Hazlitt under the title *Shakespeare Jest-Books* (3 vols., ib., 1864). The interesting jest literature of Germany and its influence is discussed by C. H. Herford in *The Literary Relations of England and Germany in the Sixteenth Century* (Cambridge, England, 1886). Consult Ernst Schulz, *Die englischen Schwankbücher bis herab zu "Dobsons drei Bobs"* (Berlin, 1912). See also the remarks on the Spanish rogue story in the article on the Novel.

JESTER. A clownish wit, akin to the court fool (q.v.), often called the jester, or the King's jester, and simply one kind of minstrel. (See Minstrel.) The jester in the Sanskrit drama is represented by the *viduṣaka*, a character of mingled gluttony, cowardice, and knavery, redeemed only by his unswerving devotion to the King, who is his companion. It is noteworthy that the *vidusaka* is always a Brahman, a fact which is plausibly explained by the supposition that he was a stock character borrowed by the classic Hindu drama from the folk plays. In Latin comedy the intriguing slave Davos is perhaps a prototype for ignoble but amusing characters in modern comedy. During the Middle Ages weirdly dressed and clownish devils either terrified or entertained by their antics the onlookers at the miracles and mysteries. In Spain the *gracioso*, or jesting buffoon, has the same function in the dramas of Lope de Vega, Calderón, and other dramatists, as Vidusaka had in India. In Italy Pantaleon, an old buffoon in Venetian costume, and Arlecchius were indispensable personages in the *Commedia dell' arte*, and they passed through France into England.

JESUITS, jĕz′ū-ĭts (Fr. *Jésuite*, from Neo-Lat. *Jesuita*, from Lat. *Jesus*), or SOCIETY OF JESUS. A religious order of the Roman Catholic church. The preliminary step to the foundation of the society was taken when, on Aug. 15, 1534, Ignatius of Loyola (see IGNATIUS), with eight associates—Pierre Le Fèvre, a Savoyard; James Laynez, Francis Xavier, Alfonso Salmeron, and Nicholas Bobadilla, Spaniards; a Portuguese, Simon Rodriguez; Claude Lejay and Paschase Brouet—took, in the chapel on Montmartre, Paris, vows to make a pilgrimage to the Holy Land and devote themselves to the conversion of the infidels. Owing to the breaking out of war with the Turks, they could not make the pilgrimage as planned, so they applied themselves to various spiritual works in and around Venice, from which it had been their intention to sail. They lived more or less in common, but were not united in a formal way until 1538, when the first idea of permanent organization came. They went to Rome and laid the preliminary sketch of the constitution of their proposed order before Pope Paul III, who approved it in 1539. The formal creation of the Order of Jesuits was made by bull dated Sept. 27, 1540. In founding the Jesuits, Ignatius is often said to have contemplated repairing the losses occasioned to the church by Luther; but at this time he had scarcely heard of him. His object was the increase of devotion among the adherents of the church. The motto of the new order was *Ad Majorem Dei Gloriam*, often abbreviated A. M. D. G. (to the greater glory of God). The members bound themselves, besides the usual three vows of religious orders—poverty, chastity, and obedience—by a fourth vow to go as missionaries wherever the Pope might send them.

The order was inaugurated in 1541 by the election of Ignatius as general. He wished to refuse this office at first, but was finally prevailed upon to accept it. The name chosen—Society (or more properly Company) of Jesus—was meant to recall that Ignatius' idea in its foundation was that they were to be a band of soldiers in the army of the church. What time he could spare from the government of the society and his many good works the general devoted during the next 10 years to the drawing up of the formal Constitutions and rules of the order. In 1550 these were submitted to the members and received certain modifications in detail. The revised text, written by Ignatius himself and known as the autograph text, was then sent to all the fathers, even to those in India, and suggestions asked. Such as seemed proper were incorporated in a third text, which forms the Constitutions of the Jesuits now in force. These are essentially from the hand of Ignatius, never having received any important modification. They are considered by Jesuits of the present day as the palladium of their existence as a religious order. The most important parts of the Constitutions are those that prescribe the training to which each member of the order shall be subjected. The formation, as it is called, of the Jesuit for his life work takes about 18 years. As a rule, before entrance into the order he has already pursued studies equivalent to those required for the collegiate degree of A.B. The first two years of novitiate are spent in spiritual exercises, prayer, meditation, and ascetic reading, in the practice of mortification, and in humble occupations of various kinds. During his first year the novice devotes 30 days of retreat, as it is called, in absolute silence, to making the spiritual exercises of St. Ignatius. These consist of meditations on the last four things to be remembered and on the life of Jesus Christ. Every year of his life afterward, no matter what his status in the society, at least eight successive days are devoted to the same purpose. At the end of the second year of novitiate the candidate takes simple vows of poverty, chastity, and obedience. Then two years are devoted to the study of the humanities and the modern languages. After this three years are given to philosophic and scientific studies, during which, though a definite course is marked out for all, opportunities are provided for those who wish to pursue special studies. At the completion of these seven years of study of self, the humanities, philosophy, and science the young Jesuit, usually now about 25 years of age, is sent to teach for five years in a Jesuit college. If he has shown predilection and talent for some special study, he will, as far as circumstances permit, be assigned to teach this branch. He is not confined to one class during his years of teaching, but is supposed to go up with his class during the course, thus providing for his own mental development as well as the consistent progressive formation of his students. After the period of college work the Jesuit studies theology for three years and then is advanced to holy orders. For one year more theological studies are continued, and then opportunities are given the young priest for mission work and spiritual employment of various kinds for a year, after which a final year of novitiate, called the third year of probation, is prescribed. During this year the Jesuit devotes himself exclusively to the study of spiritual things, his own character, the ways and means of the Institute of the society, its rules and Constitutions. During his third year the 30 days' retreat of silence and prayer, according to the method of the spiritual exercises of St. Ignatius, is once more made. After this final year of probation the candidate is admitted to the last solemn vows, now four in number, because they include a special vow of obedience to the Pope. Those who accomplish this full course are called professed fathers.

The rules prescribe in detail the Jesuit's daily occupation, and, as far as circumstances allow, a definite routine is followed very exactly by all the members of the order. The Jesuit rises at 5 A.M. Half an hour is given to physical preparation for the day. He devotes one hour to mental prayer, for which there has been 15 minutes of preparation the night before. He then hears mass or, if a priest, says mass. About 7 A.M. he breakfasts, and after a few minutes devoted to a review of his morning meditation, and especially the practical resolutions that it has led him to, he begins the day's work, whatever it may be—studying, teaching, preparing sermons, missions or retreats, or writing books or articles. He is advised by his rules not to continue any one form of occupation, whatever it may be, for more than two consecutive hours without a diversion of mind for some minutes at least. About noon he devotes 15 minutes to a review of his morning's work and plans the work of the afternoon, so as to do better. Dinner is taken in common, and then, according to rule, one hour is passed in recreation in common. About 9 P.M. the community assembles for the recital of the litany of the saints and of the Blessed Virgin. This is the only daily spiritual exercise in common enjoined by rule. Even this did not originate with Ignatius himself, but with St. Francis Borgia, the third general of the society. Ignatius wished to leave his order free for work and study, depending on the constant direction of the motives of their work to make them spiritual men. The litanies are followed by 15 minutes devoted to the selection of a passage of the life of Christ for meditation next morning. Then follows the evening examination of conscience. At 10 o'clock all are in bed, unless special permission is given for further work. The *Monita Secreta* (q.v., Secret Admonitions), a masterpiece of craft and duplicity, supposed to have been issued for the private direction of thoroughly initiated members of the order, is now acknowledged by all serious authorities to be an invention of the enemies of the Jesuits.

The government of the Society of Jesus, though often spoken of as autocratic, is a striking example of a limited constitutional authority, practically the first of its kind. The order is governed by a general, whose power, said sometimes to be absolute, is strictly limited by the Constitutions. He is elected by a general congregation and holds his office for life. He may be deposed by a general congregation under certain conditions prescribed by the Constitutions, though such an incident has never happened in the history of the order. A general congregation is composed of the general, or his deputy, and the five assistants who form his council, besides the provincials, or heads of provinces, and two deputies from each province. The provincial deputies are elected by the professed fathers and the rectors of the province. When the general congregation, which has no fixed time, meets, all important concerns come before it. It alone has power to dissolve a college or professed house or a novitiate once established. The general has power to dispense with some provisions of the Constitutions in particular cases, but he cannot alter or annul them. All others in authority hold office for a limited time, usually for three years. The assistants who compose the general's consultors are elected by the general congregation and are chosen from certain groups of provinces. At the present time there are the Italian assistancy; the French; the Spanish, which includes also missions in South America; the German, which includes the Low Countries and Austria; and finally the English, including England and North America, with missions in South Africa and in India. For the assistance of the general there are also an admonitor and a father confessor. The general's admonitor is bound to inform him of any faults he may commit. While the general consults with his assistants, he is not obliged to follow their advice, even when unanimous.

There are four classes of Jesuits: 1. Professed fathers, who, after their 18 years of preparation, have taken the four solemn vows mentioned above. It is from this class alone that the general and all the higher officials of the society are chosen. 2. Coadjutors, spiritual and temporal. Spiritual coadjutors are priests whose health or talents have not permitted them to reach the standard of knowledge required for professed fathers and who help in preaching, teaching, and the direction of souls. Temporal coadjutors are the lay brothers to whom the menial offices and certain minor duties are assigned. 3. Scholastics, who, having passed through the novitiate, are engaged either in their own studies or in teaching in the colleges. 4. Novices, who, after a short trial as postulants, are engaged for two years exclusively in spiritual exercises, prayer, and ascetic reading and practices.

The administrative and executive government of the society is intrusted under the general to provincials who are named by the general and hold office for three years. In each province the superiors of the colleges, professed houses, and novitiates are appointed by the general, who receives from them at stated intervals—monthly from provinces, quarterly from colleges and novitiates—a detailed report of the character, conduct, and occupation of each member of the society. Far from making a system of espionage, this detailed knowledge only gives superiors such information with regard to subjects as enables them to make the best possible use of them with the least possible danger of failure under trying circumstances. Ignatius gave his order no distinctive dress (though that of the Spanish priests of that time has come to be adopted by Jesuits generally), so that they might be freer for intercourse with the world.

The Jesuits spread rapidly. At the death of Ignatius (1556) there were 1000 members of the order, in 12 provinces. At the end of the century there were over 10,000. When the celebration of the centenary of their foundation came in 1639, they numbered over 13,000. A century and a quarter later, at the time of their suppression, there were 22,600 Jesuits throughout the world. Wherever they were, they were considered as the special upholders of the papacy and the most faithful defenders of the Roman Catholic church. This accounts for most of the opposition to them. When there was difficulty between the Republic of Venice and the Pope, during the first half of the seventeenth century, the Jesuits were excluded from the Venetian states. Their close adhesion to the Pope made their position in France often insecure. Gallicanism saw in them implacable opponents, and Jansenism (q.v.) recognized them as the foes most to be feared. The Sorbonne and the University of Paris opposed the introduction of the society into France and always continued to be jealous of the educative influence acquired by it. Finally, Mme. de Pompadour became a bitter enemy because the Jesuits refused her the sacraments unless there should be an end of her liaison with the King. The philosophic party was opposed to the Jesuits because it saw in them the most prominent factor in the conservation of Catholic thought and education. This united opposition brought about the exiling of the Jesuits by royal edict throughout the French dominions in 1764. The example was followed in a few years by the other Bourbon courts—Spain, Naples, Parma, and Modena. In 1759, through the machinations of the Prime Minister Pombal, who saw an opportunity of enriching himself at their expense, the Jesuits had been expelled from Portugal. The charges that they were the source of the attempt upon the King's life and were fomenting disaffection among the Indians in the so-called reductions of Paraguay, recently transferred from Spain to Portugal, were evidently trumped up. Pope Clement XIII (1758–69) interposed vainly in their behalf and used every effort to reconcile the governments. Pope Clement XIV (1769–74), pressed by the ambassadors of so many Catholic governments, at length issued, July 21, 1773, the brief *Dominus ac Redemptor Noster*, by which, without adopting the charges made against the society or entering in any way into the question of their justice, acting solely on the motive of "the peace of the church" he suppressed the society in all the states of Christendom. Submission to the brief was immediate and complete. In Spain and Portugal the members of the society were driven into exile. In other Catholic countries they were permitted to remain as individuals, engaged in the ministry or in literary occupations. Two non-Catholic governments, those of Frederick the Great of Prussia and Catharine II of Russia, refused to allow the brief of suppression to be published in their dominions because they could not replace the Jesuits as educators. In these states the Jesuits retained a quasi-corporate existence as a society for education.

What was meant to be the suppression of the society proved but a temporary suspension. In 1792 the Duke of Parma secured a partial reorganization for his dominions. In 1801 Pope Pius VII (1800–23) permitted the formal reestablishment of the Jesuits in Lithuania and White Russia and with still more formality in Naples in 1804. On Aug. 7, 1814, by the bull *Solicitudo Omnium Ecclesiarum*, the complete rehabilitation of the order was made. Since then the Jesuits have continued to spread all over the world.

Among the works of the Jesuits there is none to which they devoted themselves with more zeal or, we may add, with greater success than that of the education of youth. St. Ignatius himself insisted on this and was the first to make education the special ministry of a religious order. The principles to guide the society in its educational work were laid down by Ignatius in the fourth part of the Constitutions. This was, however, only an outline of a system of education. At first the Jesuits adopted the methods of teaching then followed in the various Catholic schools of Europe, drawing chiefly from the traditions of the great University of Paris, the alma mater of St. Ignatius and his first companions, though with due attention also to the developing methods of the humanistic schools of the Netherlands, then justly celebrated. The theory that the Jesuits' method of education was borrowed largely from the "Plan of Studies" of John Sturm of Strassburg is now admitted to be false. From 1540 to 1599 the society was engaged in forming a complete system of studies. Plans were drawn up and put in practice in various colleges, as, e.g., those of Nadal and Ledesma. The practical system thus created was completed under Acquaviva, the fifth general of the society, who ruled during its most brilliant period (1581–1615). In 1584 a committee of six experienced Jesuit teachers of different nationalities drew up a preliminary plan which was tried in all the colleges of the society. The results of this five-year trial were reported to Rome, and the suggestions made were employed in drawing up a modified plan, which was sent to the various colleges in 1591. After this plan had been tested for over five years, the final plan was drawn up and formally issued in 1599. This is the famous *Ratio Studiorum*, which was the fruit of long and patient efforts and the result of the combined wisdom of the whole society. The system is divided into three parts: (1) *studia inferiora*, inferior studies, which consist chiefly of linguistics, the literary study of the classical languages with history, archæology, etc., as collateral branches; (2) arts, or philosophy, consisting of philosophy, mathematics, and the natural sciences as far as they were known and cultivated in those times; (3) theology. In the lower course, that of humanities, there were ordinarily five classes, in some places six. These were called the grammar classes, first, second, and third, then humanities, or poetry and rhetoric. After the restoration of the society at the beginning of the nineteenth century the needs of the times demanded a change in the educational system. Father Roothaan, then general, proceeded with the same care as Acquaviva in securing the opinions of the best educators in various countries. The revised *Ratio Studiorum* was published in 1832. This was not definitive, but was considered subject to such further changes as might prove advisable in the course of time and the progress of education. The principles of the old *Ratio Studiorum* are preserved, but greater attention is recommended to the natural sciences, and special care is to be devoted to the teaching of the mother tongue. The Jesuits have always been markedly successful in the teaching of Latin and Greek. The essence of their method is the prelection or preliminary explanation of a passage by the teacher, followed by the pupil's study of it and then by recitation, which includes grammatic, historic, and other details. Imitative themes are a prominent feature, and, as far as possible, the pupil is brought to a speaking knowledge of the language studied. Frequent repetitions are recommended. The thoroughness of this system is exemplified by their own mastery of the Latin tongue and the lasting knowledge acquired by their students, especially in the classic languages. How well the recommendation to devote more attention to the sciences has been carried out is shown by the fact that such great astronomers of the nineteenth century as De Vico, Perry, and Secchi were Jesuits.

The number of the colleges increased very rapidly. Within 50 years after the papal approbation the Jesuits had colleges all over the world, not only in Europe, but in the Indies, China, Japan, Mexico, and Brazil. At the time of the death of Acquaviva (1615) the society had 372 colleges. Shortly before the suppression of the society, about the middle of the eighteenth century, there were 728 colleges, many of which had an average attendance of 1500 or more, while in some the number of students was from 2000 to 3000, and no college is mentioned with a lower number than 300. Taking the lowest possible average, the 700 Jesuit colleges must have had about the middle of the eighteenth century 300,000 students. This influence was all the more important as they insisted on moral and religious training. Such Protestant writers as Ranke, Paulsen, Quick, and others candidly admit that the Jesuits during these centuries were the best educators, so that many parents not of the Catholic faith intrusted the education of their sons to them. The spread and development of Jesuit colleges during the nineteenth century was slow but steady. The order had to struggle against great difficulties. The colleges which it possessed before the suppression were in the hands of the civil authorities. The persecutions and expulsions of the society from various countries prevented the establishment of new colleges and put an end to those already in being. Notwithstanding this, in the year 1906 the Jesuits had about 220 colleges throughout the world with more than 55,000 students. There were more than 20 new colleges established from 1900 to 1905, but the Associations Law in France caused the suppression of nearly as many others. In the United States they have colleges at Worcester, Mass., Boston, New York City (Fordham University), Georgetown, D. C., Jersey City, N. J., Washington, D. C., Baltimore, Chicago, Cincinnati, Detroit, Milwaukee, Omaha, St. Louis, St. Mary's, Kans., Galveston, Mobile, New Orleans, Denver, San Francisco, Santa Clara, Cal., Buffalo, Cleveland, Spokane, and Manila, P. I. The Jesuits also have charge of the Apostleship of Prayer, or League of the Sacred Heart (q.v.).

The Jesuit missions are the source of the greatest honor to the order. St. Francis Xavier's (q.v.) work in the Indies recalled the apostolic times. He knew how to organize his many missions, so that his numerous converts became faithful Christians in the best sense. His brethren on the missions imitated his example and almost rivaled his success. Venerable Joseph Anchieta, called the Apostle of Brazil, before the end of the sixteenth century organized missions among the natives of that country into settlements of the kind that in Paraguay, later, were called reductions. The first reduction of Paraguay was founded in 1610. For nearly a century and a half the native converts lived in ideal peace and happiness. These native Christian communities have been the admiration of students of social science ever since. At the beginning of the seventeenth century, after 20 years of patient effort, Father Ricci succeeded in getting audience of the Emperor of China. His skill in applied mathematics and mechanics gained him the favor of the Emperor, and he obtained protection for the Christians in China. Scholarly successors, equally able and zealous, Schall, Verbiest, and Bouvet, continued the good influence over the Emperor. Unfortunately, after a time, the controversy over the Chinese rites took place. Certain practices of their former lives, which, in imitation of the Apostles, the Jesuits allowed their converts still to keep up, seemed to the Dominicans to savor of idolatry. In the midst of the disputes the Imperial favor was lost, and persecutions wiped out the Chinese missions. The Japanese missions were begun in 1549 by St. Francis Xavier, and in 30 years had grown to number 200,000 Christians. Bloody persecutions, continuing for nearly three centuries, made numbers of martyrs; but with a marvelous tenacity, though all their priests had been put to death, the survivors handed down their faith from generation to generation, and when Japan was once more opened to Europeans in the nineteenth century, there were still natives ready to welcome the Catholic missionaries as their long-lost fathers. In India Robert de' Nobili (1605) took up the difficult task of living as a high-caste Brahman, fulfilling rigidly their precepts of abstinence and avoiding all contact with other castes. After years of patience he succeeded in making numerous converts. The careers of Fathers Lallemont, Brebœuf, and Jogues among the Huron and Iroquois Indians were a succession of sufferings and hardships, deliberately undertaken, calmly borne, and heroically persisted in by men of gentle breeding and deep culture. The Jesuit missions were always centres of civilization as well as religion. When the United States government took possession of the Philippines, the Jesuits in charge of the observatory at Manila were asked to collate the information with regard to the archipelago in the possession of members of the order, and this was published in two large volumes with an atlas at the Government Printing Office (*El Archipiélago Filipino*, Washington, 1900). In 1914 the Jesuits numbered 8178 priests, 4400 scholastics, and 4137 lay brothers, making a total of 16,715. There were 28 provinces. The Rev. Francis X. Wernz, a distinguished canonist, the general of the whole society, died in 1914, and on Feb. 11, 1915, Father Wlodimir Ledochowski (q.v.), nephew of the late Cardinal Mieczyslaw Ledochowski, was elected general.

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JESUIT'S BARK. An old name for cinchona (q.v.).

JESUIT STYLE. The name frequently applied to the baroque style of architecture in its ecclesiastical phases. It is marked by pretentious, theatrical decoration, a flagrant misuse of stucco enrichments, recourse to figure sculpture in extreme and sensational attitudes, and a general disregard of restraint and refinement. Its name is due to the great number of Jesuit churches erected in this style during the seventeenth century in Italy and Germany. Its beginnings are seen in the church of the Gesù at Rome (1568), and its culmination in that of Santa Maria della Vittoria, by Maderna, and in many German churches. See Baroque.

JES′UP, Morris Ketchum (1830–1908). An American merchant and philanthropist. He was born at Westport, Conn., and was educated there and in New York City. In 1843 he entered the employ of a manufacturing firm at Paterson, N. J. In 1852 he went into business on his own account, from which he retired in 1884. He is best known for his philanthropic work and his interest in scientific exploration. He was one of the organizers of the United States Christian Commission during the Civil War, was one of the founders of the Young Men's Christian Association, and its president in 1872, was president after 1860 of the Five Points House of Industry, of which he was one of the founders, and after 1881 was president of the New York City Mission Society, for which he built the De Witt Memorial Church in Rivington Street. In 1881 he became president of the American Museum of Natural History. To this institution he gave much during his life and at his death left over $1,000,000. He presented Jesup Hall to the Union Theological Seminary, and endowed the Jesup North Pacific Expedition for scientific research. He was chosen president of the New York Chamber of Commerce and was president of the International Congress of Anthropology in 1902. To the subject of Southern education, especially that of the negro, he gave much time and thought. He was treasurer of the Slater Fund at its beginning, and he was also made a member of the Peabody Educational Board and of the General Education Board. In 1905 he was knighted by the Czar for philanthropic work. Consult *Resolutions in Appreciation of Morris Ketchum Jesup*, by Trustees of American Museum of Natural History (New York, 1908), and W. A. Brown, *Morris Ketchum Jesup* (ib., 1910). In 1915 the Metropolitan Museum, New York, received by bequest of Mrs. Jesup a large and valuable collection of paintings.

JESUS, Society of. See Jesuits.

JESUS, Son of Sirach, sī′răk. See Ecclesiasticus.

JESUS, Wisdom of. See Ecclesiasticus.

JESUS CHRIST. In order to appreciate the work of Jesus, it is necessary to understand the political and religious condition of the Jewish people, to whom he belonged and among whom his work was carried out. *Politically.*—The Jews were subjects of the Roman Emperor, the dominion of the Romans having been established by Pompey in 63 B.C. After that time various adjustments of Palestine's relations within the Empire took place, and when Jesus began his public ministry the government of the country was divided as follows: Galilee, with the land to the north, east, and southeast of the Sea of Galilee, was under the rule of Philip and Antipas, sons of Herod the Great, who, as *rex socius*, had had the entire land as his kingdom. Philip's territory was the land north and east of the Sea of Galilee (Ituræa and Trachonitis); the territory of Antipas was Galilee itself and the land southeast of the Sea of Galilee (Peræa). Both regions were ruled as tetrarchies. On the other hand, Judæa, Samaria, and the land of Idumæa, south of Judæa, were more distinctly provinces under the rule of a Roman procurator (Pontius Pilate), who to a certain degree was subordinate to the Governor of the Province of Syria. This continued to be the political situation throughout the ministry of Jesus. (See HEROD.) *Religiously.*—The Jews had returned from their exile with a new hold upon the monotheism of their religion and a new devotion to Yahwe's law. This spirit had been strengthened by the persecutions which they had undergone under the rule of the Seleucidæ and the revolt by which, under the Maccabees, they had broken from that rule, producing at the time of Jesus' ministry an exaggerated conception of the ceremonial requirements of the Mosaic law, in the interpretation of which had arisen a body of legal refinements that added greatly to the burden of the law and to the power of those who administered it. See MACCABEES; JEWS.

It was a characteristic of Jewish life, however, to combine religion and politics. As a result, there arose in the nation during the time of the Maccabæan revolt, when the religious and political elements in the people's life were brought to accentuation, two great parties, whose significant influence increased as with the religious elements in the national life were mingled with increasing energy the political. These parties were the Pharisees and the Sadducees (qq.v.). The Pharisees (literally *Separatists* or *Purists*) were the party of religion. The characteristic of their creed was the scrupulous observance of the law. They represented the religious idea dominant among the people since the return from Babylon, while, in their devotion to the conception of the theocracy and their expectation of a Messiah who should restore it to its independency, they expressed what in general were the people's political views. They were, in brief, the popular party. The Sadducees (a name derived from Zadok, the priest whom Solomon put in the place of Abiathar, 1 Kings ii. 35) were the party of the priesthood. They represented the priestly nobility, and their object was the retention of priestly power in the state. They were largely indifferent to religion as such, giving their thought rather to politics, in which their aim was to keep in favor with the ruling power.

In addition to these were two minor parties, which more or less added to the politico-religious confusion of the times. Of these parties the political was the party of the Herodians, the religious, the party of the Zealots (qq.v.). The Herodians arose with the introduction into Jewish politics of the family whose name they bore, and were committed to the political interests of that family in its effort to establish a rule in Palestine, the spirit of which would be a union of Judaism and Hellenism. With them the religious element was minimized, if it was present at all, though they did not hesitate to combine with the religious parties when their aims could thus be furthered. The Zealots arose with the recession of the Pharisees from active interest in national affairs. Their principles were those of the Pharisees, only they were ready, as the Pharisees were not, to carry these principles into action to any extent. In this party, consequently, the religious element resulted in a fanaticism which made them the most dangerous factor in the troublous conditions of the times.

Separate from all these parties stood the Essenes (q.v.), who were unique in their absolute removal from all politics and their complete dissociation from the public worship of the temple. They were characterized by the strictness of their community life, their strenuous regard for ceremonial purity, their unselfish practice of the community of goods, and their uprightness of life. Their organization was confined to Palestine, and their main roots were laid in Pharisaic Judaism. Yet they were subject to foreign influences, Oriental rather than Greek, which contributed largely to their isolation among the parties of the land. In fact, they were a sect rather than a party, and as a sect emphasized the idea of an exclusive brotherhood.

Of these parties and sects the people were most influenced by the Pharisees, who best expressed popular ideas, and with whom the people came most vitally in contact, especially through the authoritative channels of the temple, the synagogues, and the schools. In fact, the control of the last two institutions was almost wholly in the hands of the Scribes, who were the expounders and administrators of the law, and who almost exclusively belonged to the Pharisaic party; while in the temple itself their influence and authority was an increasingly important factor. This popular influence of the Pharisees was naturally most felt in Judæa and Jerusalem, where the observance of the national religion was concentrated, and where the religious rulers had their home, but there and elsewhere there were those among the people who, while reverencing the Scribes and following the general line of their directions, still held to a direct fellowship with God in worship and life.

From this survey it is clear that Jesus, while finding a special receptivity among these devout ones of the people, as a religious teacher and worker among the Jews must have come more or less into contact with the sects and parties of the land; that this contact, in proportion as Jesus' position involved opposition to national ideas and customs, must have been one of conflict; and that this conflict, in proportion as the parties combined politics with their religion, must have been one of menace to his work and to his life.

As given in the Gospel history, Jesus' life and work most naturally divides itself into two prominent periods—the *Galilean Period,* which was largely one of construction, centring upon the gathering around himself of a body of disciples; and the *Judæan Period,* which was largely one of instruction, having as its object both the preparation of his disciples for the closing events of his life and the presentation to the Jews of his Messianic claims. Between these two main periods lay the short *Intervening Period* covered by his withdrawal into the regions of northern Galilee; while preceding them was the *Preliminary Period* of his younger years, leading up to his formal induction into his work and his early ministry in Judæa; and following them was the *Culminating Period* of his life, issuing in his betrayal, crucifixion, resurrection, and ascension.

A. **The Preliminary Period.** (*a*) *The Period of his Early Life.*—Jesus was born in the sixth or seventh year before the Christian era, towards the close of the reign of Herod the Great. (See NEW TESTAMENT CHRONOLOGY.) It is quite impossible to read the record of his birth as given in the Gospels of Matthew and Luke without realizing that the circumstances preceding and attending it were of such supernatural character as to mark it as miraculous.

Attempts have been made to show that the sources of the record were legendary; but these are confronted with difficulties which compel the conviction that the narrative is trustworthy. (See GOSPEL, *Nativity.*) His birth occurred in the town of Bethlehem in Judæa, where Joseph and Mary had gone for the purpose of registration in connection with one of the Imperial enrollments customary in the provinces. After Herod's death Jesus' home was in Nazareth until the time of his formal entrance upon his public work. Of these early years practically no information has come to us, the Gospels giving, besides the summary statements of Luke (ii. 40, 52), but one event of that time, his visit to the temple (Luke ii. 41–51), while the extra-canonical traditions referring to this period are worthless. (*b*) *Induction into Public Work.*—Though the Gospels do not give the processes of development by which Jesus came finally to the consciousness of his Messiahship and his Messianic work, yet the disclosure which they make of the relations of the disciples to their Master shows that the way by which they came to realize that he was some one greater than a prophet was the way by which he himself came to the consciousness of his unique spiritual relation to God. They saw and he knew that, unlike all others around him, he had no consciousness of sin in himself. Spiritual communion between himself and his Father was uninterrupted and unclouded, and his life was an unimpaired realization of this fellowship. Conviction of this fact doubtless came to him gradually, as knowledge of self and its relations to God generally comes to the soul; but this consciousness must have pressed upon him the question as to what such a fact involved for him in the work and service of life; for such relationship with God could only mean that there was a work for him to do which would measure up to the unique character of the relationship. Otherwise, what was the reason for the relationship and this conviction of a work his Father had ready for his doing? It was with this consciousness of himself that he heard of the message of the Baptist that the Kingdom of God was at hand, and it must have been with the conviction that the establishment of this Kingdom was the work to be committed to him that he came to the Jordan to be baptized, as a public confession of his consecration to this work. At all events, with the baptism in Jordan at the hands of John the Baptist, it is clear that to Jesus' mind his work was formally undertaken, and that he conceived of his work, not as that of a rabbi, nor even as that of a prophet, but as that of the Messiah foreshadowed and promised to the people of God in the Old Testament Scriptures. Following upon his baptism Jesus retired to the neighboring wilderness. There for a season he was subject to an inward struggle with thoughts which this public consecration to his mission most naturally brought to him—a struggle rightfully termed a temptation; for, having consecrated himself to this great work, the question was now before him, in what spirit and by what means and methods he should carry it out. The more exalted one's mission to the world, the more real are the testings of character in its accomplishment. From this period of inward conflict he returned to the scene of his baptism, where he met certain of the Baptist's disciples, to whom he had been pointed out by their teacher. They were Andrew and Simon, his brother, Philip and Nathanael, and, apparently, also John, all of them residents of Galilee. This acquaintance proved to be the beginning of their discipleship, and their discipleship formed the nucleus of all of Jesus' subsequent following. (*c*) *Early Judæan Ministry.*—After a short visit to his home Jesus returned to Judæa to be present at the Feast of the Passover, in the spring of the year (27 A.D.). While there he made a public declaration of his mission of religious reform by driving out of the temple the traders and money changers, who had been gradually permitted by the priests to bring their business within the sacred inclosure.

There was nothing formal about this act. Conscious as he was of his intimate fellowship with his Father and of the deeply spiritual work his Father had given him to do, it was impossible that the commercialized life of the temple should stand before him as anything save a corruption of its worship, whose right to exist he must challenge in this public act. Nor was there anything light-hearted in what he did. He clearly foresaw that the ceremonialism which had made such corruption possible would not accept the spiritual claims with which it was challenged, and that in rejecting these claims he himself would be rejected as making them, and that the rejection of himself would inevitably involve a hostility whose bitterness would have but one fatal end. The experience of the prophets would have justified an ordinary spiritual insight into the religious life of Judaism in coming to such a conclusion, and Jesus' knowledge of the religious forces with which he was confronted was something more than that of an Old Testament seer. At the same time Jesus was not fatalistic in what he did and said on this occasion. His message and mission were to the heart and will of men, and from the beginning to the close of his work he moved with a hope that men would hear the glad tidings of the message he bore them and throw themselves into his mission for the establishment of the Kingdom of God in the world.

But here, in this first act of his ministry, his hope was disappointed. The people felt the power of the conscious authority with which he challenged the corruption of the temple life; they were impressed with the miracles he performed, but they were not brought to any personal commitment of themselves to him—Nicodemus, who, during his stay in the city, sought an interview with him, was a type of this half-way belief in him; so Jesus withdrew from the city and for a while—possibly during the summer and autumn—remained in Judæa, carrying on, with such of his disciples as had accompanied him to the feast or as had attached themselves to him in Jerusalem, a simple work among the people. Upon the imprisonment of the Baptist, however, he withdrew permanently into Galilee, passing through Samaria, in a village of which region, Sychar by name (the modern Askar), he spent a few days in successful work. Coming finally to Galilee, he made Capernaum his home and the centre of his work. Here he called to his more formal following Simon and Andrew and John, who had come to him at the Jordan, and with them James, the brother of John, and in their company he began his stated ministry.

B. The Galilean Period. The heart of Jesus' mission was to awaken men to the fact of the love which God had for them and through such awakening to relate their living in loving obedience to his will. So he announced to them that the Kingdom of God was at hand, and in order to let them see the reality of its presence wrought before them those wonder deeds which to their minds, trained in the Hebrew religion, must have shown in action the divine forces against the evil influences of sin. The casting out of demons, the cleansing of lepers, the raising of the dead—these were not merely proofs of Jesus' power, but evidences of the fact that the forces of the Messianic age were being released upon the world; for demonic possessions were considered as directly due to Satan, while leprosy was a recognized emblem of the corruption of sin, and death was looked upon as its punishment. In showing himself master of these Jesus not simply aroused attention to himself as a prophet in Israel, but as a prophet who had a direct message to the religious life of the people. This message, however, would not have been understood had his miracles been unaccompanied with instruction. As a matter of fact, it was poorly understood even then; but slow to understand it as were the people to whom it was given and even his chosen disciples, we can comprehend how it came that such portions of it as have been preserved to us in the composite address known as the Sermon on the Mount and in the group of parables delivered by the Sea of Galilee are of the character they are. The atmosphere in which the Jew had been religiously trained being that of ceremonial righteousness, it was necessary, from Jesus' point of view, to emphasize the higher character of the righteousness which his religion required, and yet its essential identity with the real righteousness demanded in the law. It was equally necessary to make clear the divisions and separations which such requirements would bring among men, and the judgment involved in such process. The character of this newer righteousness is brought out in the Sermon on the Mount, delivered towards the beginning of his Galilean work. The judicial results involved in it are portrayed to a large extent in the parables which were uttered towards the close of that work.

With this purpose of announcing by deed and word the advent of God's Kingdom in the world, Jesus carried on his work from Capernaum as a centre. His method was to make stated tours of the neighboring towns and villages, heralding the fact that the Kingdom of God was at hand and proclaiming his authority in this announcement by miraculous deeds. Three of these tours are reported in the Synoptics during this period of his Galilean work: (1) Mark i. 35–39, Matt. iv. 23–25, Luke iv. 42–44; (2) Luke viii. 1–3; (3) Mark vi. 6, Matt. ix. 35–38, xi. 1. These tours in Galilee afforded Jesus the opportunity he desired of coming widely in contact with the people of the country and bringing before them his message. With his presence among them in the streets and market places, teaching and working miracles, there could be no ignorance of the fact that a prophet had arisen in Israel and a new message had come to the people from Yahwe. As a result, Jesus secured to himself a large following among the people, who became increasingly enthusiastic as the conviction that he might possibly be the national Messiah grew upon them. As this following increased in numbers, he organized it more formally by the selection of 12 of his disciples to a closer relationship to himself. (See APOSTLE.) To these he increasingly directed his instruction, with a view to the work he looked forward to their doing as his future representatives. We have a formal exhibition of such instruction in the discourse of Matthew x.

But the religious conceptions of the people had been dulled by ceremonial formalism and hardened by political misfortunes; it was inevitable, therefore, that such a teacher and worker as Jesus would not find acceptance with their religious leaders, in whom this condition was most realized, nor with that portion of them most under the influence and control of these leaders. For this reason Jesus had selected Galilee as the place for his constructive work. The people of the north were less ecclesiastical and more receptive to such a message as he had to deliver and such a mission as he had to perform. While, as the Messiah, he must give his message finally to the religious centre of the land, and while the desire of winning that centre to the Kingdom of God must have been great in proportion as the centre held in itself the people's future, yet it was clear that such winning of men to the Kingdom was more probable in Galilee than in Jerusalem and Judæa. On this principle he had done his work and spent his time in the northern portion of the country. At the same time the fact of hostility to Jesus among the Jerusalem leaders not only early manifested itself in that city, but, as their representatives from time to time went into Galilee and came in contact with Jesus' work, it showed itself even there. Indeed, all the political parties were opposed to him and came gradually to combine in persecution of him. The offense which united them was the spiritual character of his mission; though, under the leadership of the Pharisees, the main point of attack, both in Jerusalem and in Galilee, was the free and independent attitude Jesus maintained towards the ceremonial regulations of the law, particularly those which gathered around the observance of the Sabbath.

As his popularity with the multitudes increased, it took upon itself more and more a political character, until, after the feeding of the 5000, the enthusiasm of the people led them to a public effort to force Jesus as the nation's Messiah into a political revolution against Rome. It was clear that the Master could meet this crisis in only one way. He must present to the people in a way they could not misunderstand the essential opposition of his mission to their political hopes. This was the motive of the profoundly spiritual discourse on the Bread of Life (John vi), which was delivered in the synagogue at Capernaum shortly after this feeding of the multitude. But so steeped were the people in their nationalism that its only effect was a confusing of their false views of Jesus and a benumbing of their superficial devotion to his cause. In fact, it broke his influence with them and practically ended his work in Galilee.

C. **The Intervening Period.** With his work in Galilee brought thus to an end, it was natural that his thoughts should turn to Jerusalem. If the political hopes and passions of the common people had turned them against the spiritual character of his mission, then there was nothing further for him to accomplish among them, and there remained only the religious centre of the people's life to which he could appeal. His hope that the covenant people would hear him and return to fellowship with God had been again unfulfilled, but it was not to be abandoned until he had delivered his message to the holy city, the heart of the nation's religious life. With this hope he goes up to Jerusalem soon after the Passover referred to in John vi, which, inasmuch as it came at or near this crisis of his Galilean work, he did not attend. He makes the occasion of his visit the unnamed feast mentioned in John v. 1*—most likely the Pentecost following the Passover of chapter vi—and while at the feast performs a notable miracle and in connection with it delivers a searching discourse. But again his hope of the people's receptivity to his message and their acceptance of his mission is disappointed, and he sees instead a hostility develop which is consummated in a determination to put him to death.

Confronted with such a situation, he must leave the city. He must leave it, however, not to return to his Galilean work, for that now was over, but to go into the unjewish regions north and east of Galilee, where organized work could be laid aside and the time given to the thought which must now be pressing upon him as he sees clearly the coming of the long-foreshadowed closing of his life, and the opportunity embraced of bringing his disciples to such an understanding of the spiritual character of his Messiahship as would carry them through the tragedy of his death and send them out to herald his message of God's love and God's claims to the uttermost parts of the world.

So understood, this time spent in the region of Tyre and Sidon and in the Decapolis is an essential part of Jesus' preparation for his closing ministry in Jerusalem and not another ministry among unjewish folk, undertaken as a judgment upon the unreceptivity of the people of his own land. The public work he does is desultory and in a manner forced upon him, for he could not be hid; but the moving purpose of his retirement, apart from meditation upon the coming crisis in his own life, was the instruction of the disciples in the spiritual character of his Messianic work. That this is so is clear from the disciples' confession of his Messiahship with which this period was closed, the exultant approval with which this confession was received on the Master's part, and the statement that from this time on he began to disclose to the disciple band the inevitable catastrophe which awaited the further progress of his work (Matt. xvi. 13–28 and parallels). The falling away from him which had been occasioned by his recent discourse in Capernaum had depressed them, especially as they came to realize its positive and permanent character. On the other hand, they themselves shared the popular conceptions of the promised Messianic age as an age which would be national as well as religious (see Acts i. 6), so that to their minds the ultimate issue of the Master's mission could not possibly involve his death. They were thus disposed to resent such an outlook on his part. But Jesus was clearly conscious that it must be met at last in Jerusalem. His final return to Galilee from the north consequently was not to resume there his work among the people, but to pass through that region on his last journey to Jerusalem.

D. Judæan Period. This journey brought him to the city at the Feast of Tabernacles (28 A.D.), not, however, as an attendant upon the feast, but apart from it, arriving after the feast had begun, apparently in order to avoid as far as possible the ceremonial atmosphere, while taking advantage of the presence of the people to get his message to them as a spiritual reality in and of itself. He found the people full of discussion about him, wondering why he had not come up to the feast, and largely divided in their opinions regarding him. To their confusion of mind, he spoke unhesitatingly, criticizing the unbelief which underlay it, and asserted with full frankness of claim his own divine authority. But whatever hope he may have had that these claims would be accepted, the only outcome of his discourse—apart from a passing arousal of a wavering attraction towards him—was such embitterment of feeling against him that his life was endangered and he withdrew from the city. Shortly before the Feast of Dedication, however, he returned, throwing the people anew into discussion and division by a significant miracle upon a man born blind and by further discourses. But these things resulted simply in another threatening of his life, which again compelled him to leave the city. This withdrawal was of longer duration and for the greater part spent at a distance from the city. It was mostly occupied with an instruction of the disciples and the multitudes, having in view the approaching crisis of his work and life. Miracles, however, were performed—among them the remarkable one at the grave of Lazarus, the result of which in its impression upon the people was so compelling as to crystallize the enmity against him among the authorities into a definite determination to put him to death.

E. Closing Period. On the approach of the Passover (29 A.D.) Jesus returned for the last time towards the city, reaching Bethany six days before the event. On the Sunday of Passover week, in the midst of a large concourse of people, attracted to him from among the pilgrims to the feast, he entered the city with a publicity of popular enthusiasm superficial as that in Galilee had been, and yet impressive enough to arouse to renewed bitterness the enmity of both Sadducees and Pharisees. During the rest of that day, as well as on Monday and Tuesday, he remained in the city, withdrawing to Bethany for the night, where he also spent in retirement the whole of Wednesday and most of Thursday. These days in the city were given to an unrestrained presentation of his Messianic claims that brought him into open conflict with Pharisees, Sadducees, and Herodians together. So came to final issue the hostile purpose of his enemies. This issue was reached on the night of Thursday. On that night Jesus ate with his disciples a meal, in connection with which he referred to his approaching death clearly and distinctly as a sacrifice for sin. (See GOSPEL, *Lord's Supper*.) Leaving the house where the supper had been eaten, the Master goes out with his disciples across the Kidron to an olive orchard which had been transformed into a private garden, where with the three disciples with

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*A careful study of the events narrated in the Fourth Gospel shows several displacements of the original sequence, the most obvious of which is that of the fifth chapter, which should follow and not precede the sixth. Consult Lewis, *Disarrangements in the Fourth Gospel.* See also JOHN, GOSPEL OF.

whom he had been most intimate he retires for prayer. Facing as he did the nearness of a murderous death, it was but natural that there should have been agony in this prayer; but, with our understanding of Jesus' consciousness of himself and his mission, this could not have been the mere fear of physical dissolution, even with all the certainty of violence which surrounded it, but rather the realizing sense of its significance as the answer of sin to the love of God. That, in obedience to the Father's command, he must let this take its course and through the perfidy of one of his own disciples realize itself—this was the cup which he prayed if possible might not be pressed to his lips. While in this garden, he was apprehended by a band from the chief priests and Pharisees. This band was under the lead of Judas Iscariot, one of the Twelve, who had betrayed him to the authorities. Upon his arrest he was taken before Annas, an ex-high priest, by whom he was examined. He was then led before a hastily gathered meeting of the Sanhedrin, where such process of trial as might be called by that name was gone through with, at the close of which he was subjected to a personal examination by Caiaphas, the high priest. In this examination Jesus is challenged to confess to his Messianic claims. Though he had been silent against all the fabricated charges of the trial, against this challenge—fundamental and essential as it was—he could not hold his peace, and his admission of the claims is his condemnation by the council. As the morning dawned, Jesus is bound as a prisoner and led away to the Governor, Pontius Pilate, with charges which provoked discussion between Pilate and the leaders and induced Pilate to question Jesus as to himself and the charges brought against him. From this questioning Pilate was convinced of Jesus' innocence and resorted to various expedients to save him from the hatred of the rulers. This, however, was a difficult task; for the rulers had gathered to their aid and support the populace, who, disappointed at Jesus' failure to realize their political hopes, had turned revengefully against him and, with the chief priests and elders, were insistent on his death. Finally, through a shrewd presentation of the case as one involving his political attitude to the Emperor, Pilate was inducėd to yield and give Jesus over for crucifixion. This final act in the great drama of this wonderful life was carried out at a place outside the city, named by the Fourth Evangelist Golgotha (John xix. 17). Its location is impossible of certain identification; but it was evidently an eminence easily in sight of the passing public, in fact prominent enough to be visible from afar. Here Jesus was crucified between two outlaws. Around the crosses were gathered a riotous mob of people and religious officials from the city, a few of the more loyal disciples, and the Roman guard, who watched the agony of the hours till death mercifully intervened. Upon them all the tragedy of this scene wrought a deep impression. Those whose enmity to Jesus had brought the deed about doubtless had not conscience enough to suffer remorse; certain it is that to the Master's disciples it marked the end of all their hopes. On the evening of the day the body was taken by Jesus' friends from the cross, through Pilate's permission, and hastily laid in a sepulchre near at hand. On the first day of the week which followed certain of the women disciples, going to the tomb for the purpose of completing the burial, found that the stone had been rolled away and the sepulchre itself was empty. Later on that day Jesus himself appeared to the women, and then to other of the disciples in various places and to varying numbers, and these appearances were repeated at intervals during 40 days. There was no doubt in the minds of the disciples to whom these appearances came that they had had intercourse again with the Master whom they had known and followed during his ministry in Galilee and Judæa. In fact, it was upon this conviction alone that they recovered from the hopeless despondency into which his death had thrown them, and it was upon their positive testimony of this personal intercourse with their resurrected Master that the Christian community in Jerusalem was later established and the Christian Church throughout these ages has lived and wrought its mission in the world. During this post-resurrection period Jesus gave himself to interpreting to his disciples the meaning of his death in the light of the Old Testament Scriptures, and to further instructing them in "the things pertaining to the kingdom of God" (Acts i. 3), and at some time within this period he laid upon them the specific commission to go out into all the world as his representatives and bring men into his discipleship (Matt. xxvii. 18–20). Finally, in a company of the disciples whom he had led out from the city to Bethany, he was taken from them into heaven. (See GOSPEL, *Resurrection.*) From Bethany the disciples, returning to Jerusalem, waited until the day of Pentecost, when, under manifestations of special inspiration from heaven, they began their work of the proclamation of Jesus' religion to the world.

It is not possible in the compass of a brief article, if indeed it is necessary, to estimate the character of a personality unique in human history as was this. Varying as are the opinions which have gathered around his life and work, his advent into the world has set in motion a reformation of its thought and living which has not only continued in its development throughout these centuries but is in a more vital realization of itself to-day than it has ever been. And the significant thing about the power of this movement is that it comes, not from the impression created by the wonder deeds which he performed, which, after all, were not so many, nor from the influence wrought by the peculiar teachings which he uttered, which, taken all in all, were not so extensive, but from the influence and the impression of himself. It was this that from the first laid hold of his disciples and in the dark hour of his death would not leave their minds. It was this fact of the experience of Christ that made the fact of his life among them so significant and has convinced the centuries that have followed that this personality is not the creature of a literary imagination nor even of a pious sentiment, but a divine event in the human history of the world.

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JESUS CHRIST IN ART. The representations of Jesus Christ are the most important part of Christian iconography (q.v.). In the early period art did not try to embody God the Father or the Holy Ghost in any human form—the former, if attempted at all, was symbolized by a hand appearing out of a cloud; the latter, by the form of a dove. Even in the acts of creation and in the Old Testament events embodying relations between God and man, it is always the Son who is represented by the artist. The early Church possessed no authentic portraits of Jesus. During the first three centuries the traditional opinion was that he was unsightly in appearance, according to the familiar passage, "He hath no form nor comeliness . . . there is no beauty that we should desire him" (Isa. liii. 2). In the early fourth century Eusebius, in the well-known reply to a letter from the Emperor Constantine's sister, who desired a portrait of Christ, stated that no such portraits existed. Not until the eighth century does one of the fathers, John of Damascus, venture to describe Christ's personal appearance, and yet even during the early centuries there were various theories on the subject. Broadly speaking, there were two schools: one, chiefly the African church, maintained that Jesus was ugly, in order to proclaim the triumph of mind over matter, of internal over external beauty, and out of hatred for the Hellenic pagan worship of the beautiful; the other, mainly the Greek fathers, refused to see in him anything but perfection. The Latin church did not intervene forcibly on either side. At all events, the early Church was hostile to any but symbolic representations of the Redeemer, and during the first three centuries his portraiture in art was carefully avoided.

Early and Middle Ages. In early Latin art, represented in the catacomb frescoes (second to fourth centuries) and sculptured sarcophagi (third and fourth), he is a youth, beardless, with long curly hair—so young that by no possibility could it be supposed to be the portrait of a man of 30. Artists evidently wished to avoid being accused of attempting any such thing. But before the close of the fourth century St. Augustine speaks of the different types of portraits of Christ which artists were then attempting. Of these types one survived all others and with modifications was handed down to the Renaissance. It was purely conventional, and only later writers sought to base it upon early tradition, such as the description in the spurious "Letter of Lentulus," and the acheiropoetic images, or miraculous portraits, like the handkerchief of Veronica. This type had an oblong oval face, with broad smooth forehead, straight slender nose, arched brows, hair parted in the middle and falling in long ringlets over the shoulders, a full beard of moderate length, and an expression grave but sweet. This bearded, poetic, and intellectual type originated with Greek Christian art and was brought by it to Italy. Some examples of it appear in the catacombs; imperfectly in the sarcophagi (a fine example in the Lateran Museum); better in the frescoes (at St. Calixtus and St. Pontianus); coarsely at Santa Costanza; more refined in the mosaics of Santa Pudentiana (c.400), Rome, and Sant' Apollinare Nuovo (c.500–550), Ravenna. It is primarily intended to represent the Christ triumphant, transfigured, or in heaven, not the Christ of the earthly miracles. The beardless type became entirely obsolete before the close of the fifth century. Christ was represented bearded and somewhat older, whether on earth or in heaven. In turn, this type was replaced by a third, usually called the Byzantine, because it is the prevailing one in surviving Byzantine churches. It represents the Redeemer as aged, with elongated face, long beard, deep-set eyes, and an expression of lifelessness. The transition to this type appears at the end of the fourth century in the mosaics of St. Paul Without the Walls, and in the fifth century in Sant' Apollinare in Classe Fuori, Ravenna. It dominated the art of the Christian world until the advent of the Gothic period in northern Europe and the beginnings of the Renaissance in Italy. Mention should be made of late nineteenth-century efforts to trace the origin of these Christ types to certain ancient gods: the youthful, beardless type to Apollo, the Good Shepherd type to Dionysus, and the later bearded type to Æsculapius or Jupiter Serapis. The proof advanced for these theories, however, is not sufficient to establish their probability. The changes in the Christ type from the earlier youthful to the later ascetic ideal were more likely conditioned by the increased emphasis upon the dogma of the deity of Christ and the corresponding change in the ideals of the times.

During the second century almost the only way of presenting him in the catacomb frescoes was as the Good Shepherd, either carrying a lamb on his shoulders or in the midst of the sheep; then, in the third century, came the first use of the scene of the Adoration of the Magi, and perhaps even earlier the Baptism, the Samaritan woman at the well, and the Resurrection of Lazarus—subjects used as symbols and not as episodes. The commonest method was to present Christ under symbols that only the faithful would recognize—as the Lamb, the Fish, the Vine, as Orpheus charming with his music. With the triumph of Christianity (312) a new stage opened, in which on the one hand the art of the catacombs is continued in the sculptured sarcophagi, and on the other the monumental art of the basilicas strikes a new note in representations of Christ. Such episodes of the life of Christ as would be suitable were carved on the sarcophagi, but as yet no complete historic series of these episodes were attempted. Christ triumphant was enthroned in the apses of the new churches; enthroned or seated on a globe or standing among the Twelve Apostles, teaching them and giving Paul and Peter authority to preach and govern. The scene is in the heavenly Jerusalem, and from beneath his feet flow the four rivers of Paradise. The spiritualizing of the scenes continued up to the fifth century—the mosaics of Santa Costanza (c.330), Santa Pudentiana (c.400), Santa Maria Maggiore (c.436), and St. Paul (c.450), all in Rome, show how the visions of St. John acquired more and more influence, until the culmination is reached in the 24 elders casting their crowns before a radiant bust of Christ in a medallion, with the four living creatures on either side. While this spiritual element was being developed, art was beginning to construct, also under Greek influence, a complete series of pictures of the life of Christ, in three main groups: (*a*) Infancy, (*b*) Miracles, (*c*) Passion; beginning with (1) the Annunciation, (2) Adoration of the Magi, (3) Massacre of the Innocents, (4) Presentation in the Temple, (5) Flight into Egypt, etc. The collection of sarcophagi in the Lateran Museum in Rome gives the best series of subjects illustrating the miracles—the wooden doors of Santa Sabina (fifth century) and the mosaics of Sant' Apollinare, Ravenna, the most detailed series of the Passion scenes, which were still without any element of suffering. Christ even here was the triumphant King. In the Santa Sabina reliefs is the first known portrayal of the Crucifixion. The Sant' Apollinare series of c.500 admirably illustrate their transitional age. In the 13 scenes from the miracles Christ is the beardless youth of the Christian sarcophagi (fourth century); in the 13 scenes from the Passion he has the later, more majestic, bearded type of the heavenly and triumphant Christ. The favorite scene in the apse of the basilicas is Christ on a throne or a globe, his head surrounded by a nimbus, holding a book in his left hand and blessing with his right, accompanied by angels and saints, who replace the apostles of the fourth century, except occasionally, though Peter and Paul are often retained. Sometimes—as at St. John Lateran, St. Paul, and San Venanzio—only a bust of Christ appears in the clouds. Until the ninth century the popularity of the Apocalypse and the scenes from the heavenly Jerusalem caused the lamb to be retained as an emblem of Christ, even after a council of the Church had forbidden such pictures. The period from c.500 to 800, therefore, while it witnesses the creation of a positively individual type of Christ and gives artists the liberty of portraying all the events of his life—even those of the Passion—lays but little stress on the humanity and the sufferings, much on the divinity and triumph, of Christ. The Carlovingian age (800–1000) inaugurated the idea of the terror-striking Christ. The Apocalyptic scenes were partly replaced by realistic Last Judgments. The story of the painter missionary Methodius terrifying the Bulgarians into conversion by such a painting is typical. At the beginning of the period it is not universally so—witness the beautiful mosaics of Santa Prassede in Rome. The type of Christ, also, still breathes majestic sweetness and calm. Byzantine art probably invented at this time some of its most beautiful types of Christ, handed down since by tradition—Christ winged as the Angel of the Divine Will, or as the High Priest. The illuminated manuscripts of this period, both Byzantine and Carlovingian, give the most varied material for study. A favorite new composition is Christ crowning the Emperor (or Empress) of the East or West. In the eleventh and twelfth centuries Christ becomes more and more the severe Judge, with whom the Virgin and John the Baptist act as intercessors, though he is still surrounded by the four cherubim Evangelists, the Twelve Apostles, and sometimes the 24 elders. But he no longer appears seated on a globe or a throne with a few saints in the celestial sphere—he is almost always brought into immediate contact with human affairs. The frescoes of Ferentillo, San Tommaso in Formis, San Pietro in Grado, in Pisa, the mosaics of Torcello, and innumerable other works of the eleventh and twelfth centuries show the increasing emphasis upon the severe side of Christ's character and the theological and dogmatic tendency. The growing asceticism of the type of Christ is shown also in Byzantine art, which, however, retains much beauty and serenity, which it does not lose until the twelfth century. The mosaics of San Marco in Venice, of the cathedral of Cefalù, of Monreale, and the Capella Palatina in Palermo are among the most important series of scenes and types of Christ. The Byzantine conception, as expressed in the Greek *Guide to Painting*, edited and translated by Didron and Durand, should be read in the presence of such mediæval works, to show how traditional and carefully taught were all representations of the Saviour, as to type, age, garments, color, attitude, grouping with other figures, etc.

The devotional idealism and realism of the thirteenth and fourteenth centuries dispute the field with the power to recreate a spiritual type of Christ. In Italy the tendency was to give prominence to the sufferings of Christ. This is painfully evident in those Crucifixions of the Berlinghieri, of Margaritone, Cavallini, Giovanni Pisano, and other painters and sculptors. The emaciated and distorted body, the drawn face, the gaping wounds, are intended to excite a sentimental piety. French Gothic art was more sedate. The Christ carved for the cathedrals was the divine Teacher. The statue of the Beau Christ of Amiens is typical of a large class, to be met with in Chartres, Rheims, Paris, and elsewhere. Comparing the art of the West, both in its works and in such literary treatises as that of Durand (*Rationale Divinorum Officiorum*), it is evident that the West is comparatively narrow in its range of representations, and that it lays increasing emphasis on the psychological, even the pathological, side of Christ's life—a side very lightly touched upon in the East. At the same time representations of the three persons of the Trinity became common in the West for the first time, often strangely imagined. For the first time, also, the scene of the Virgin and Child is often repeated. Not that it was entirely unknown in earlier times, but its sudden popularity accords with the humanitarian and psychological period. At the close of the Middle Ages we are confronted by two important factors: first, the death of the Christian (Byzantine) art of the East, which removes what was at that time the most original and spiritual element in representations of Christ; second, the revival of painting under Giotto and his successors. Both of these factors had an important bearing on the later development.

Renaissance and Modern Types. During the Renaissance painting became the favorite means of depicting the Christ type—rather than sculpture, which is concerned chiefly with the human body, or mosaics, the chief value of which is decorative. With a marvelous union of wholesome naturalism and classic idealism the Italian painters of this period established an ideal type of Jesus and left representations of his life which became the models of future painting and still dominate our conceptions of the subject. Every significant phase of his existence on earth and in heaven, from the "Annunciation" (q.v.) to the "Last Judgment," was portrayed with loving care and skill. Most frequent of all was the representation of the infant Jesus with his mother; this subject, usually termed "The Madonna," will be found treated under that heading. Among the scenes of his life represented, the following are treated in special articles of this ENCYCLOPÆDIA: "The Nativity," usually combined with "The Adoration of the Shepherds"; "The Adoration of the Magi"; "The Massacre of the Innocents"; "The Flight into Egypt"; "The Marriage of Cana"; "The Last Supper"; "Ecce Homo"; "The Crucifixion"; "The Bewailing of Christ," usually called "The Pietà" (q.v.); "The Resurrection"; "Christ's Appearance to the Magdalen," usually called "Noli me Tangere" (q.v.); "The Supper at Emmaus"; "The Last Judgment."

During the late thirteenth and the fourteenth century, although the grandiose, mediæval type of Christ still prevailed, there was increasing freedom in depicting his life. The Sienese, chief of whom was Duccio, clung to the Byzantine ideal, with an increasing tendency to soften the type, while the Florentines, at whose head stands Giotto, cherished a less conventional and more virile ideal. The union of these two tendencies promoted the type of the mild and suffering Christ, which reached its culmination in the paintings of Fra Angelico. During the fifteenth century the Florentines, from Masaccio on, depicted the strong and virile type, and this was the ideal of the Realists, some of whom, like Andrea del Castagno, represented Christ as little more than a peasant. The Umbrians, on the other hand, continued the Sienese tradition of the mild and suffering Redeemer, as may best be seen in the works of Perugino. Practically every important painter of the Italian Renaissance endeavored to realize the Christ type and depicted scenes from his life. The Christ ideal of the Renaissance was perhaps most perfectly realized by Leonardo in "The Last Supper," by Titian in his "Tribute Money" and other masterpieces, and by Raphael in such paintings as "The Transfiguration" and the cartoons for the Sistine tapestries. Following the ascetic tendencies of the Counter Reformation, Italian painting of the seventeenth century emphasized the suffering Christ, as may especially be seen in the many "Ecce Homo's" by Guido Reni and others.

The portrayal of Jesus and his life was a theme of no less importance in northern painting. In Flanders during the fifteenth century Jan van Eyck established a type which greatly influenced the painting of the succeeding epoch, and such masters as Rogier van der Weyden, Dirck Bouts, and Hans Memling represented scenes of his life with power and pathos. The type culminated in the beautiful and serene Christ of Gerard David. The subject was a favorite one with Quenten Metsys, whose "Ecce Homo's" are well known. Among German painters of the Renaissance Dürer deserves special mention for the powerful yet serene Christ type which he so often painted and engraved. Among the Flemings of the eighteenth century Rubens stands preëminent for his powerful representations, while Van Dyck's Christ type is more refined. Among the Dutch and, indeed, among the painters of all times, Rembrandt stands unrivaled in his presentation of the human side of Christ's nature, particularly in its pathetic phases.

The Spanish school depicted especially Christ's suffering and developed a type in which realism was combined with ascetism and solemnity. The Christ types of El Greco, Vicente Juanes, and Murillo are probably the finest of the school. During the eighteenth century all religious subjects lost their former importance in painting, and even the nineteenth century produced little worthy of comparison with the great works of the past. Mention should be made of the pure Greek conception embodied in Thorvaldsen's marbles. In painting the sincerest work has been done by the Germans and English. Early in the century the German Nazarenes (q.v.) revived religious painting with more piety than artistic ability. At the middle of the century the Pre-Raphaelites, especially Holman Hunt and Burne-Jones, painted the life of the Redeemer with much reverence and infinite detail. In the late nineteenth century Eduard van Gebhardt painted scenes from his life with great power and originality, and Gebhardt's work was continued, with deep pathos, by Fritz von Uhde, who depicts Jesus surrounded by the people of the present day. Far better known in Germany and elsewhere are the paintings of Joseph Hoffmann, but this is due to pleasing illustrative qualities rather than to depth of sentiment or real artistic merit. In France many of the great painters, like Flandrin and Delacroix, represented scenes of Jesus' life, but their paintings are more important from the artistic than from the religious standpoint. But during recent times a few French painters, foremost among whom are Dagnan-Bouveret and L'Hermitte, have painted canvases of profound artistic and religious significance. Mention should also be made of the well-known aquarelles and illustrations of James Tissot, who with infinite care and patience has depicted Christ and the holy personages as types of present-day Jews of Palestine.

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JESUS COLLEGE, Cambridge. A college of Cambridge University. It was founded in 1496 by John Alcock, Bishop of Ely, on the site, and in part with the property, of the nunnery of Sts. Mary and Rhadegunde, which dated from 1133 and had become bankrupt in revenues, reputation, and numbers. The buildings of the college, which date from the twelfth to the nineteenth century, are among the most attractive in Cambridge, comprising as they do the old nunnery buildings and church, as well as the later collegiate additions. The almost monastic seclusion of the college and its quiet charm well warrant to-day the title bestowed on it by James I, *Musarum Cantabrigiensium Museum*, the house of the Cambridge muses. The college consisted, in 1913–14, of a master, 12 fellows, and 30 scholars, with college officials and some 212 undergraduates. It presents to 16 livings. Among the worthies of Jesus College are Archbishops Cranmer, Bancroft, and Sterne, Bishops Pearson, Fox, and Fisher, John Strype, John Bale, Laurence Sterne, and S. T. Coleridge. Consult A. Gray, *Jesus College, Cambridge* (London, 1902). See Cambridge, University of.

JESUS COLLEGE, Oxford. A college of Oxford University. It was the first college founded after the Reformation and owes its establishment to Dr. Hugh ap Rice, or Price, who in 1571 was granted a charter for its foundation by Queen Elizabeth. Later the Queen added a gift of part of the land on which the college now stands and timber from the royal forests and took the title of founder. The college was intended for Welsh students, who still form the largest part of its membership, and it has always been closely associated with Wales and the Welsh marches. The earls of Pembroke are its hereditary visitors. The college developed greatly in the seventeenth century by the benefactions and influence of two of its masters. The first of these, Sir Eubule Thellwall, obtained a new charter from James I, added in 1621 to the buildings, and doubled the endowment. The second was the distinguished diplomat Sir Leoline Jenkins, who became master of the college in 1661 and added greatly to its resources by bequest in 1685. Its buildings, chiefly of the sixteenth and seventeenth centuries, have been restored since 1850 and are now very attractive. The library is rich in scarce books and manuscripts, particularly those connected with the history and literature of Wales. In 1913–14 the college consisted of a master, 10 fellows, 34 scholars, and 186 undergraduates. See Oxford University. Consult E. G. Hardy, *Jesus College, Oxford* (London, 1899).

JET (OF. *jet*, *jaet*, *jayet*, *gayet*, Fr. *jayet*, *jais*, from Lat. *gagates*, Gk. γαγάτης, *gagatēs*, jet, from Γάγης, *Gagēs*, Γάγαι, *Gagai*, a town and river of Lycia in Asia Minor, where the mineral abounded). A black variety of bituminous coal that is easily cut and carved and takes a high polish. It occurs at various places in Bavaria, Bohemia; Aude, France; Germany; near Villaviciosa, Spain; also in the Tertiary clays along the coast of Yorkshire, England, especially at Whitby, where it is found mixed with fragments of bituminized wood of coniferous trees in the upper lias or alum shale of that district. Owing to the high polish that it takes, it is extensively used as material for dress trimmings and mourning jewelry. Among the Greeks it was considered a remedy for toothache when powdered and mixed with wine, and was applied, with beeswax, to tumors. Popular belief attributed to it a power of revealing faithlessness. See Lignite.

JETSAM, jĕt′sam (corrupted form of *jetson*, *jettison*). Goods which go down with the ship on which they are carried, or which are cast overboard from a vessel in peril of storm or capture and then sink and do not come to the surface. Such goods do not come under the description of "wreck," which, by a rule of the common law, under certain conditions, was forfeited to the crown, but continues subject to recovery by the owner. See Flotsam; Derelict; Jettison; Wreck.

JETTÉ, zhĕ′tā′, Sir Louis Amable (1836–). A Canadian jurist and statesman. He was born at L'Assomption, Province of Quebec, and was educated at L'Assomption College. He studied law, was called to the Quebec bar in 1857, and practiced his profession in Montreal. He also contributed to the political press and became editor of *L'Ordre* (Montreal). His connection with several noted legal cases gained him prominence, and he decided to enter politics. In 1872–78 he was a Liberal member of the House of Commons for Montreal East. In the latter year he also became professor of civil law in Laval University and later was appointed dean of the law faculty. From 1878 to 1898 he was a puisne judge of the Superior Court of Quebec and for the next 10 years Lieutenant Governor of Quebec. In 1903 he was one of the two Canadian members of the Alaska Boundary Tribunal in London (see Alaska, *Boundary Dispute*), and in his decision dissented from the majority. In 1901 he was knighted (K.C.M.G.). In 1909 he was appointed Chief Justice of the Court of King's Bench (P. Q.), and in the same year was made Commander of the French Legion of Honor. He was one of the commissioners for the revision of the Civil Code of Quebec and published *Observations relatives au code de procédure civil* (1888).

JET'TING. See PILE; FOUNDATION.

JET'TISON (OF. *getaison*, *gettaison*, from Lat. *jactatio*, a throwing, from *jactare*, frequentative of *jacere*, to throw). In maritime law, the throwing overboard of a ship's cargo, either in whole or in part, in cases of necessity, so as to lighten the vessel in a storm, or to prevent capture by pirates or the public enemy, or for other justifiable cause. The power to jettison a cargo is lodged by the law in every master of a ship while upon the high seas and in extremity of danger. The loss sustained by the sacrifice does not fall upon the master or upon the owners of the vessel, but primarily upon the owner of the cargo. But as he is sacrificed for the general good, he is entitled by the doctrine of general average to a pro rata contribution from the several persons interested in the ship, freight, and cargo, though there are exceptions to this rule where the goods were carried on deck. When the goods sacrificed by jettison have been insured, the insurer has the benefit of this contribution or average to the extent of his loss. See AVERAGE, IN MARITIME LAW.

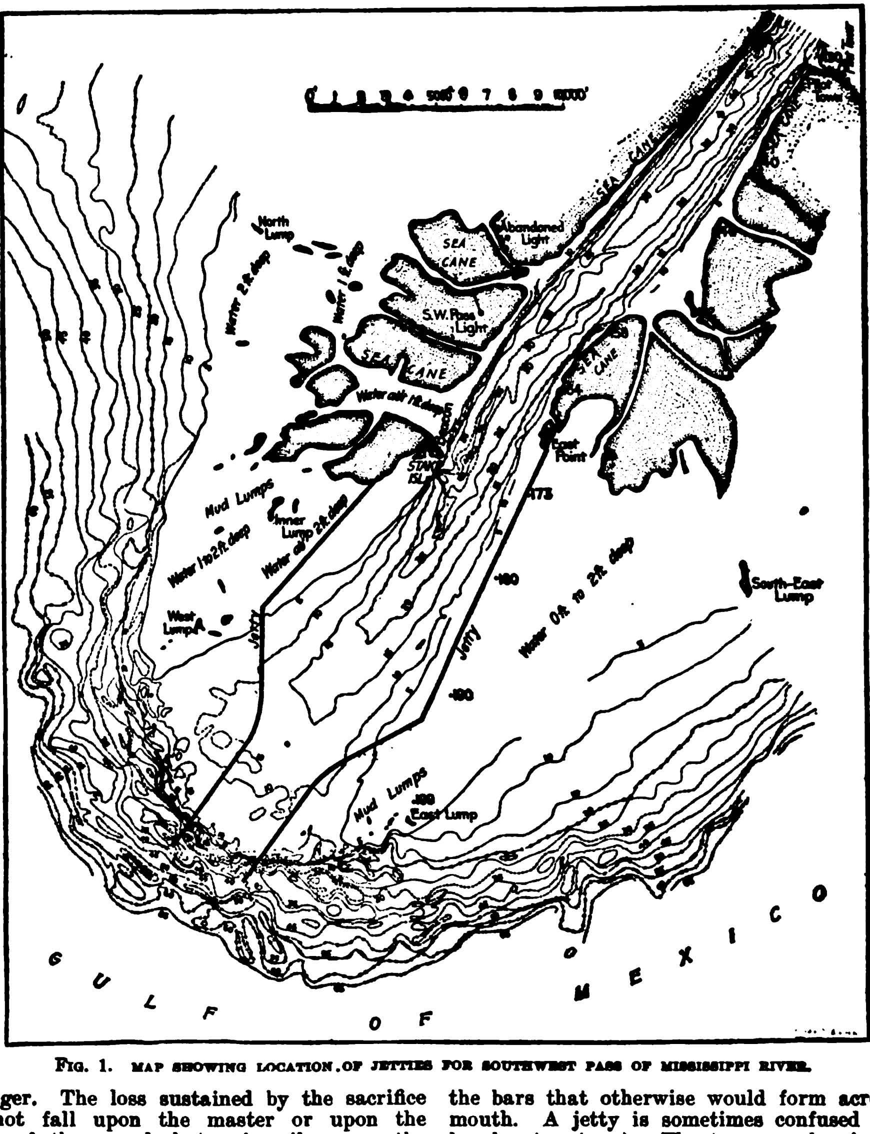


FIG. 1. MAP SHOWING LOCATION OF JETTIES FOR SOUTHWEST PASS OF MISSISSIPPI RIVER.

JET'TY (OF. *jetee*, *getee*, Fr. *jetée*, p.p. of OF. *jetter*, *jeter*, Fr. *jeter*, to throw, from Lat. *jactare*, frequentative of *jacere*, to throw). An embankment or pier extending into a lake or ocean for the purpose of controlling sand drift which would otherwise shoal up a channel or encroach on the shore. In strict parlance such embankments for the latter purpose are called groins or groyns (see SHORE PROTECTION), while jetty is reserved for structures built out from the mouth of a river to deepen the channel over the bars that otherwise would form across the mouth. A jetty is sometimes confused with a breakwater (q.v.). The two may be similar in construction, but the jetty is designed to accelerate a current and thereby cut a deeper channel, whereas a breakwater is merely a protection of a harbor against the severity of the open sea. Quite possibly, however, the same structure may serve both purposes.

On an exposed coast there is generally a considerable drift of sand or shingle along the shore, due either to the prevailing wind or to offshore currents. An alluvial river emptying into the sea will at the same time carry down with it a great quantity of silt and sand which, coming in contact with the littoral drift and the dead water of the open sea, is deposited as a bar which shoals the channel just beyond the mouth and, in extreme cases, forces the river into one or more other outlets. For purposes of navigation it is necessary to cut through this bar to preserve the channel depth. Dredging is often resorted to for this purpose, but the jetty has been found to be one of the most effective methods inasmuch as it is automatic in its action.

Jetties are built generally of large broken stone which is dumped in a self-shaping mound seaward from shore, either from a trestle, a barge, or the already completed jetty. Other materials which are used are timber, earthwork, cut stone, concrete block, and wood mattresses. The structure is similar to a breakwater, and all of the methods of construction described under **Breakwater** apply equally well to jetties.

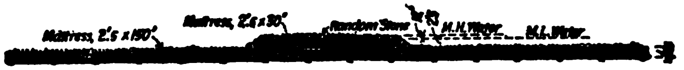
Twin jetties are two embankments roughly parallel (though often converging towards the outer end) projecting from either side of the river mouth and forming a continuation of the river banks, so that by confining the river its current is concentrated and its force increased sufficiently to scour a channel across the bar and to deposit its drift and sediment out in deep water. At the same time the windward jetty keeps the littoral drift from depositing at the river mouth. The obvious difficulty in the method is that in time the deposit beyond the jetty head may tend to form a new shoal, which for a time can be kept clear by dredging, but which eventually may require a lengthening of the jetties.

Practically all jetty construction is of the twin jetty type, but there have been built single jetties, on the leeward side of the channel, with the idea that the sand drift will drive the channel to the jetty and the latter will hold it in one position, with a consequent improvement in depth. As a rule the theory does not work out in practice. At Aransas Pass, Texas, there has been built a special type of single jetty, called by its inventor a "reaction breakwater," which has a specially curved plan designed to force the paralleling current alongside the jetty, where it can scour out a channel. Its principle is very debatable and its success doubtful in the one example because of the presence in the channel of some old jetties which may or may not be influencing the scour.

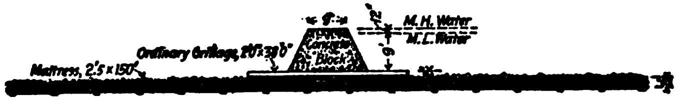
Jetties have been constructed at the mouth of too many rivers to note here, but brief description will be given of the notable and typical examples of the Danube and Rhone in Europe and the Mississippi and Columbia in the United States.

Mississippi Jetties. The most famous jetties in the world are those at the mouths of the Mississippi River, although they were built subsequent to, and partly as a result of the lessons from, those at the Rhone and the Danube. It is well known that the Mississippi River makes its way to the Gulf of Mexico through three great branches or passes. On the extreme left to the east lies Pass à l'Outre, about 14 miles in length to land's end. In the middle lies South Pass, which, before its improvement, was about 12 miles long. On the right, to the west, lies Southwest Pass, about 17 miles to land's end. In 1874, after a very bitter controversy, Congress authorized Capt. James B. Eads to improve the South Pass by the construction of two parallel jetties at his own expense, with the provision that he was to receive payment therefor when he secured a final permanent depth of 26 feet in the 350-foot channel between the jetties. The east jetty was made 11,800 feet long from land's end to 30 feet of water in the Gulf; the west jetty was 7800 feet long and was built 1000 feet from the east jetty and generally parallel with it. The first work was to drive a row of piles spaced 12 feet apart to mark the inner lines of the two jetties. These piles served to guide the operations of sinking the mattresses and were not intended to give strength to the work.

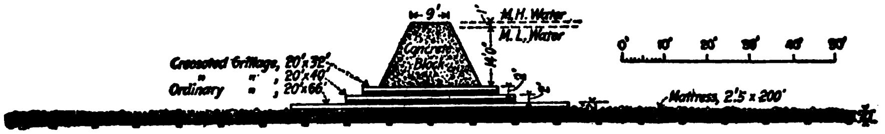
The jetty structures proper consisted of several layers of willow mattresses, loaded down with stone. The first layer was composed of mattresses 100 feet long and 50 feet wide, and the succeeding layers of mattresses of the same length, but decreasing in width to the top mattress, which was 20 feet wide. Generally four courses or layers of mattresses were sufficient to bring the mattress work to the water surface. Each mattress was composed of four layers of willow brush, which, when compressed, gave it a thickness of about 2 feet. The mattresses were built on launching ways on shore, towed into position behind the guide piles and sunk by loading them with stone. After the mattress work was thoroughly settled, the sea end of each



Water 3 ft. deep at M.L.Tide.



Water 9 ft. deep at M.L.Tide.



Water 18 ft. deep at M.L.Tide.

Fig. 2. TYPICAL CROSS SECTIONS OF EAST JETTY FOR SOUTHWESTERN PASS OF MISSISSIPPI RIVER.

jetty was surmounted by a capping of concrete blocks. The work was started in June, 1875; by August, 1876, a depth of 20 feet had been secured, by February, 1878, a depth of 22 feet, by July, a depth of 24 feet, and by October, 1878, 30 feet. Captain Eads's theories were thus vindicated, and experience has proved them correct.

In 1899 the United States Army Engineers submitted plans for the construction of jetties at the mouth of the Southwest Pass of the Mississippi River, according to the design shown in the accompanying figures. Construction of the jetties was commenced in December, 1903, and completed January, 1908, at a cost of about $2,627,000. Extension of the east jetty for 3000 feet and of the west jetty for 3750 feet was commenced in 1909 and completed in 1912. The final depth gained by the jetties with the aid of extensive dredging is 35 feet. A résumé of this improvement and of the previous work on the South Pass by William Starling, United States Engineer Corps, was published in *Engineering News* (New York) of Aug. 23 and Oct. 4, 1900. See Mississippi River.

Columbia River Jetty. The Columbia River, ever since its discovery in 1792, has been the chief harbor of the Pacific Northwest, but the shifting character and variable depth of the bar channels have always caused its entrance to be held in terror by mariners and shipowners. To improve these conditions a jetty extending out seaward from the south cape was completed in 1895. Its total length was nearly 4½ miles. It was constructed by sinking mattresses of brush 3 feet thick and 40 feet wide and surmounting them by a mound or ridge of rubble stone. From a low-water depth, generally of 19 feet to 22 feet, in shifting and uncertain channels across the bar, the depth was increased to 30 feet in a single channel. The improvement did not prove permanent, as a gradual shoaling set in, and by 1902 the channel had moved to an unstable location and was only 21 feet in depth. In 1903 a plan was begun of making a 2½-mile addition to the south jetty, a 2½-mile north jetty, and an enlargement of the present section. The south jetty and enlargement were about completed in 1913.

Rhone River Jetty. One of the earliest large jetties was built at the eastern outlet of the Rhone River in 1852–57. Here embankments were built along both sides of the channel, closing off five minor outlets and extending out to within half a mile of the offshore bar, thereby concentrating all of the flow in a single outlet. The improvement in channel depth for a time was marked, but soon the bar formed again beyond the jetty head, owing to the shallow offshore depth, absence of littoral current, heavy sediment, and poor wind conditions. A new canal exit for the river had to be built in 1863–73, but the lessons learned from the structure were put to good use in later structures, notably the Danube jetties.

Danube River Jetties. Shortly after the Rhone improvement, work was started on the jetties at the Sulina or central mouth of the Danube. In 1858–61 twin jetties of rubble on piles and later (1866–71) with concrete block topping were carried through a 9-foot depth over the bar to the 18-foot depth offshore. They were about 4600 feet long and 600 feet apart at their extremities. Completed in 1861, they had by 1872 increased the through channel depth to 20⅓ feet and later to 24 feet.

Consult: E. H. Corthell, *The Mississippi Jetties* (New York, 1881); L. M. Haupt, "Jetties for Improving Estuaries," in *Journal of Franklin Institute* (Philadelphia, 1888); papers on "Harbors," presented before the International Engineering Congress, St. Louis, 1904, in *Transactions of the American Society of Civil Engineers*, vol. liv, part A (New York, 1905); Perilli, "Jetties of Armored Concrete," in *Report of International Congress on Navigation* (Brussels, 1905); *Engineering News* (New York, 1874–); *Reports of Chief of Engineers, United States Army* (Washington, D. C.).

JEU DE PAUME, zhē de pôm (Fr., tennis), Hall of the. A famous building in Versailles, in which the members of the Third Estate in June, 1789, met after finding the assembly room closed against them. The hall contains a great painting by David depicting the taking of the celebrated oath of the Tennis Court.

JEUNE, Paul Le. See Le Jeune, Paul.

JEUNESSE DORÉE, zhē̆'nĕs' dō̆'rā̍', La (Fr., gilded youth). A name given to a political party in Paris during the French Revolution. The term was first used by contemporaneous historians of the Revolution in 1797 by François Xavier Pagès in his *Histoire secrète de la révolution française* and has been frequently used by later writers on the Revolution, like Mignet, Thiers, Thibaudeau, and Prudhomme. It consisted of young men who, under the leadership of Fréron, endeavored to bring about a counter-revolution after the fall of Robespierre. The party was also nicknamed the *Muscadins* (scented darlings) and *Petits Maîtres* (elegants). The term and its English equivalent, "gilded youths," is commonly applied at present to the idle rich young men about town that are found in every great city. See Incroyables.

JEV'ONS, Frank Byron (1858–). An English educator and religious historian. He was educated at Wadham College, Oxford. In 1882 he joined the faculty of Durham University, where he was tutor in classics until 1910 and also censor of unattached students (1892–96), senior proctor (1896–99), university treasurer (1898–1902), subwarden (1902–09), and principal of Bishop Hatfield's Hall after 1896. In 1910 he was appointed professor of philosophy. He became an alderman of the Durham County Council in 1913. His writings, those treating of religion being especially important, include: *A History of Greek Literature* (3d ed., 1889); *The Prehistoric Antiquities of the Aryan Peoples* (1890); *Plutarch's Roman Questions* (1892); *A Manual of Greek Antiquities* (2d ed., 1895); *An Introduction to the History of Religion* (2d ed., 1896); *Evolution* (1900); *Religion in Evolution* (1906); *Study of Comparative Religion* (1908); *Idea of God in Early Religions* (1910); *Comparative Religion* (1913); *Philosophy: What Is It?* (1914).

JEVONS, William Stanley (1835–82). An English economist, born in Liverpool. He was a grandson of William Roscoe, the eminent historian, educated at University College, London, and made a fellow of his college in 1862. He held a position in the Sydney (Australia) mint (1854–59). In 1866 he received the appointment of professor of logic and mental and moral philosophy, and Cobden lecturer in political economy in Owens College, Manchester; in 1872 he was elected a fellow of the Royal Society, and in 1876 received the honorary degree of LL.D. from the University of Edinburgh.

During the latter year he was appointed professor of political economy in University College, London. Failing health caused him to relinquish his Manchester professorship in 1881. In the following year he was drowned while bathing at Bexhill, Sussex. Few writers of recent years have had a wider influence. His *Treatise on Logic* substitutes for the familiar conceptions a mathematical foundation of the syllogism, which has been widely adopted by later writers. Among theoretical economists he is most widely known by his *Theory of Political Economy*, which develops the theory of final utility which has occupied a conspicuous place in writings of later theorists. He is best known to general readers by his *Investigations in Currency and Finance*, his *Money and the Mechanism of Exchange*, and especially by the *Coal Question*, which at the time of its publication (1865) set all England in a ferment. The thesis of the work was the dependence of England upon coal, the approaching exhaustion of its deposits, and the gradual decline of English preëminence in the industrial world. Jevons had planned to write a systematic treatise on economics, but this work was never finished. The manuscript parts, with a number of essays contributed to periodicals, were published in 1905 under the title of *Principles of Economics*.

JEW'EL. See GEMS; JEWELRY.

JEW, THE WANDERING. See WANDERING JEW, THE.

JEWEL, JOHN (1522-71). A prominent English churchman of the time of Elizabeth. He was born in the Parish of Berimber or Berrynarbor, Devonshire, May 24, 1522. While a student at Oxford, he was led to favor reformed doctrines, and for openly inculcating them he was deprived of a fellowship at Corpus Christi on Mary's accession in 1553. Later he was induced to sign adherence to a form of doctrine essentially Roman Catholic; but he repented of his act and in 1555 fled to Frankfort, where he abjured his recantation. He lived at Strassburg and Zurich until Elizabeth's accession, when he returned to England (1559), was one of eight Protestant divines appointed by the Queen to dispute with a similar number of Roman Catholics, and in 1560 was made Bishop of Salisbury. In 1562 he published his work in defense of the English church, *Apologia Ecclesiæ Anglicanæ*, which was condemned by the Council of Trent. It was translated into English the same year, and by Elizabeth's order a copy was placed in every parish church. Thomas Harding published *An Answer to Doctor Jewel's Challenge* (1564), to which Jewel replied (1565); then Harding published a *Confutation of an Apology* (1566) and was answered by Jewel in a *Defense of the Apology* (1567). He died at Monkton Farleigh, Sept. 23, 1571. His complete works were issued with memoir, by Featley (London, 1609); by Ayre, with memoir, for the Parker Society (4 vols., Cambridge, 1845-50); and by Jelf (8 vols., Oxford, 1848). Consult his biography by C. W. Le Bas (London, 1835).

JEW'ELL, MARSHALL (1825-83). An American politician, born in Winchester, N. H. After receiving a common-school education, he learned the tanning business in a belting manufactory established by his father at Hartford, Conn., learned telegraphy, and after several years as a telegraph operator in the South and West returned to Hartford in 1850 and became a member of his father's firm. He accumulated a large fortune, became interested in numerous business enterprises and in Republican State politics, and, after being the unsuccessful candidate for Governor in 1868, was elected in 1869. Defeated for reëlection in 1870, he was again successful in 1871. In 1873 he was sent by President Grant as Minister to Russia, whence he was recalled in the following year to take the portfolio of Postmaster-General in Grant's cabinet. In this capacity he served until July, 1876, when he resigned in consequence of a disagreement with the President over the action of Secretary Benjamin H. Bristow (q.v.) in connection with the "Whisky Ring" frauds. In 1880 he opposed Grant's renomination, and as chairman of the Republican National Committee conducted the Garfield campaign.

JEWELL, THEODORE FRELINGHUYSEN (1844-). An American naval officer, born at Georgetown, D. C. He graduated at the Naval Academy in 1864 and served in defenses of Washington in the summer of 1863. Jewell commanded at the Naval Torpedo Station (1890-93), was superintendent at the naval gun factory up to 1896, and commanded the *Minneapolis* in the war with Spain and the *Brooklyn* in the Philippine Islands. In March, 1904, he was promoted to the grade of rear admiral and shortly afterward was placed in command of the European squadron. He retired in November, 1904. He is the author of numerous articles on professional subjects, especially ordnance and torpedoes, with the development of which he was closely identified.

JEW'ELRY (Eng. *jewel*, a finished gem, Fr. *joyau*, OF. *jouel*, ML. *jocāle*). Ornaments for the person, especially mounted gems or precious stones, and objects made of gold or silver. (See also DIAMOND; ENAMEL; GEMS; PEARL; RING.) Originally jewelry was part of the goldsmith's work—the *minuteria*, or small work, of the Italians, who called plate (q.v.) *grosseria*, or large work. As pointed out by H. Clifford Smith, jewelry naturally divides into five different classes,—objects worn (1) on the head—diadems, tiaras, aigrettes, hairpins, jewels for the hat and cap, earrings; (2) on the neck—necklaces, with their various pendants; (3) on the breast—brooches, clasps, buttons; (4) on the limbs—armlets, anklets, bracelets, rings; (5) at the waist—girdles, with their various attachments and pendants, such as chatelaines, pomanders, scent cases, rosaries. While jewelry to-day is worn principally by women, among savage and barbarous races it is worn principally by men—not only to beautify the body, but also as a mark of rank and dignity, and as charms and religious symbols.

Egypt. Of ancient Egyptian jewelry, rich in colored gems and glazes, much has been preserved in Egyptian tombs. The best collection is in the Museum at Cairo, but there are also important collections in the Louvre, the British Museum and at Berlin and Munich. The Egyptians preferred chasing and engraving to other methods of ornamenting metal, but they were skilled in soldering and repoussé (q.v.), and indeed in all the processes known to-day except enameling. (See ENAMEL.) Extraordinary evidence of what they could do is the jewelry of five princesses of the twelfth dynasty (about 2400 B.C.), discovered in 1894 at Dashur. The most important pieces are three openwork *pectorals*, inlaid with jewels, two gold crowns (one flat openwork with inlay, the other a wealth of tiny florals mounted on filigree) and a dagger with inlaid handle.

About 1000 years later is the jewelry of Queen Aah-hotp, coarser than that of Dashur, but ingeniously worked. The diadem of gold has a sphinx couchant each side of a box ornamented in checker pattern with red and blue pastes, and bearing an inscription in gold on lapis lazuli. The flexible gold chain of plaited wire terminates in ducks' heads, and carries suspended by a tiny ring a scarab of gold inlaid with lapis lazuli. The flat hinged bracelet, similar to those used to-day, shows repoussé figures on gold ground inlaid with lapis lazuli. As shown by the sculptures and the paintings that represent bracelets by bands of red and blue, many Egyptians wore two on each arm—one on the wrist and one above the elbow. But the commonest ornament, and the most necessary, was the finger ring that served as signet, with the owner's emblem engraved on the metal or on a scarab or other stone set in it. The pectoral, as the name indicates, was worn on the breast suspended by ribbon or chain.

The best Phœnician jewelry has been found in Cyprus, but it also occurs in Phœnician settlements at Sardinia, Crete, and Rhodes. It is a mixture of Egyptian and Assyrian forms, the latter of which are known to us almost exclusively from the bas-reliefs. About Phœnician jewelry much has been learned from sculptured busts like those of Yecla, now in the Madrid Museum, and the "Lady of Elché," in the Louvre, adorned with three necklaces carrying urn-shaped pendants, with elaborate diadem encircling the forehead, and with sumptuous coiffure.

Greece. Prehistoric Greek jewelry is best illustrated by the finds at Mycenæ and Cyprus, the former those of Schliemann now preserved in the Museum at Athens. Spiral patterns almost identical with the Celtic are common, and there are cuttlefish, starfish, butterflies, and other naturalistic forms expressed in repoussé. Especially numerous are the small round gold plates with perforations for attaching to the clothing; and especially noteworthy the gold diadems in the shape of long oval plates covered with rosettes in repoussé. Of later Greek jewelry the most brilliant collections are that in the Hermitage at St. Petersburg, unearthed from the tombs of Kerch and the Crimea, and the one discovered in 1905 under the temple of Artemis at Ephesus—1000 pins, brooches, beads, and stamped disks of gold—part of which is in the British Museum, but most in Constantinople. Exceedingly rich in ancient Greek jewelry has proved to be the part of Italy known as Magna Græcia. A famous burial wreath found at Armento, purchased about 1826 by Ludwig I of Bavaria, and now in the Antiquarium at Munich, is composed of roses, narcissus, myrtle, and oak leaves, enlivened by small figures of genii. Also from Magna Græcia is the extraordinarily and exquisitely beautiful gold crown in the British Museum acquired in 1898 from the collection of Count Tieszkiewicz. In granulated work the Greeks were rivaled only by the Etruscans, but they preferred filigree ornamentation—fine threads of gold delicately twisted upon the surface. Enamel they used sparingly. Gold was their favorite material, and they excelled in repoussé, chasing, engraving, and intaglio cutting, and developed to great perfection the art of soldering small objects to thin surfaces and joining the thinnest metal plates together. For designs they went straight to nature, associating simple and simplified fruit, flower, and foliage motifs with naturalistic animal and human forms. Their invention was particularly fertile as applied to earrings, both ring-shaped and pendent. See the article EARRING.

Etruria. For the Etruscans jewelry had a special charm, and though their later work is coarser, their early goldsmiths excelled in fineness and elaboration and were able to unite metals by solvents unknown to us, so that no traces of solder remained. Especially did they understand and freely employ granulation (*pulvisculus aureus*, as the Romans called it) for the decoration of gold surfaces with grains of gold of microscopic size—an art mentioned by Cellini in his *Trattato dell' Oreficeria*, but not commonly practiced in the Renaissance. In the nineteenth century it was revived by Castellani, of Rome, who discovered among the Abruzzi goldsmiths, to whom the processes had come by inheritance from antiquity. Examples of his work were exhibited at London and at Philadelphia in 1876. Important collections of Etruscan jewelry are those in the Vatican, the Louvre, the British Museum, and at Berlin and Munich.

Rome. From Etruscan and Greek jewelry is derived Roman, which under the Republic was worn modestly, but under the Empire extravagantly and luxuriously. Pliny describes a lady at a betrothal as covered from head to foot with pearls and emeralds. Coiffures were heavy with jewels and precious metals. An ancient Roman hairpin in the British Museum is 8 inches long and crowned with a Corinthian capital on which stands Aphrodite. Pearls were used lavishly, especially on earrings. Seneca complains that: "Two pearls beside each other, with a third above, now go to a single pendant. The extravagant fools probably think their husbands are not sufficiently plagued without their having two or three heritages hanging from their ears." Necklaces were often double or triple, of plaited or linked gold; or richly mounted with precious stones, especially after the Oriental conquests of Pompey, who found in the captured treasury of Mithridates "jewels for the breast and neck all set with gems"; or composed of beads of stone or glass or amber, especially the latter, which was regarded as a talisman against witchcraft and other perils. Amber with a small insect in it was particularly prized, "being valued," says Pliny, "no matter how small, at more than a healthy living slave." Cameos, large intaglios, and Imperial gold coins were popular as pendants, and the coins were also made up into bracelets. Especially extravagant were the Romans with their rings. Martial speaks of a man who wore six on each finger, and advises another who had one of monstrous size to wear it on his leg instead of on his hand. The signet use of the ring continued, and every Roman appears to have chosen his own subject or device—the portrait of a friend or an ancestor, or some symbol from poetry or mythology, serving, like the coat of arms of the Middle Ages, as a mark of identification. Rings as well as bracelets in the form of serpents were much in vogue, and also those shaped like an Herculean knot. Bezels were sometimes hollow and filled with poison for use in case of emergency. Of the officer in charge of the temple of Jupiter Capitoline, Pliny says: "Being arrested, he broke the stone of his ring between his teeth and expired on the spot."

Byzantium. Byzantine jewelry links the ancient and the modern world, having transmitted antique processes and designs not only to Russia, that still reproduces them, but also to western Europe, that until the twelfth century was decoratively subservient. Byzantine jewelry is, however, a compromise between Orient and Occident. It retains the craftsmanship of the ancient Roman Empire and the dignity of classic traditions modified by Christian ideas, but adds the patient skill of the Oriental in executing exuberant decoration. The style is admirably illustrated by the contemporary mosaic portraits of Justinian and Theodora at San Vitale in Ravenna. The garments of the Empress and her attendants are stiff with gold and richly set with jewels; pearls, rubies, and emeralds enrich her neck and shoulders and cover her head, hanging from her temples in festoons down to her breast. The most usual type of earring from the sixth century on is crescent-shaped, in gold repoussé openwork, showing a cross pattée inside a circle, supported on either side by peacocks confronted. Of course the favorite breast pendant is the cross, but not till after the fifth century. One of the finest examples that have survived is the Beresford-Hope cross in the British Museum, dating from the eighth century. It is made of two plates of gold hinged to form a reliquary, with figures executed in translucent cloisonné enamel—on one side, the crucified Saviour with busts of the Virgin and St. John; on the other, the Virgin full-length with the heads of four saints. Of the many Byzantine finger rings that have survived, most bear Christian symbols, and more are in gilded bronze than in gold.

Germania. The Gothic and other Germanic tribes had jewelry copied from Persia or farther east—colored stones, usually garnets, or cut red glass inserted in thin gold plate or placed side by side with strips of gold between. The treasure of Petrossa in the Bucharest Museum contains some of the earliest examples, dating from the fourth century A.D., among them a bird-shaped breastplate, three bird-shaped brooches, and a crescent-shaped collar rich with precious stones. Of more refined workmanship is the regalia of Childeric I, founder of the Merovingian dynasty, who was buried at Tournai in Languedoc in 481 A.D. His grave was accidentally exposed by a peasant in 1653, and the precious objects it contained—a sword, a bracelet, brooches, buckles, about 300 gold bees that adorned a mantle, and a signet ring with oval engraved gold bezel bearing the inscription *Childirici Regis*—were transferred to the Bibliothèque Nationale in Paris. Most wonderful of all is the treasure of Guarrazar, 11 jeweled gold crowns, found near Toledo in Spain in 1858, and divided between the Cluny Museum at Paris and the Royal Armory at Madrid. The most important of those at Madrid is the crown of King Svinthila (621–631 A.D.), set with large pearls and cabochon sapphires arranged in rose-shaped patterns. Suspended by chains from the lower rim is a fringe of letters set in the cloissonné manner with red-glass paste, and spelling *svintilanus rex offert*. Prolific in Anglo-Saxon jewelry have proved the ancient graves of England, particularly those of Kent, Sussex, and the Isle of Wight. The British Museum has a rich collection of decorated hairpins; beaded necklaces with pendants; brooches, many of cruciform shape; girdle buckles of gold, silver, or bronze. Of Celtic jewelry, the Dublin Museum has much —perhaps the richest collection in Europe of prehistoric gold ornaments. Among the numerous torques, the largest, over 5 feet long and weighing 27 ounces, is supposed to have been worn over the shoulder and across the breast.

Mediæval. About mediæval jewelry from the ninth century on, graves give us little information, the custom of burying objects with the dead having been forbidden by Charlemagne. But the inventories of the period show an astounding wealth of precious stones and gold and silver ornaments; and the brasses, tombstones, and illuminated manuscripts give us considerable assistance. During the Crusades the Byzantine and Oriental influence was increased by the knights who brought back from Syria, Palestine, and Constantinople (Byzantium) not only impressions of Oriental culture but actual specimens of Oriental jewelry. There began a regular importation of goods and workmen from Asia Minor to Venice, Genoa, and Pisa, who under the banner of the Cross reëstablished their trade with the East. By the beginning of the thirteenth century the West appears to have learned its lesson and became practically independent of its former sources of supply. The methods and practices of jewelers then are preserved in the monk Theophilus' famous *Schedula Artium*, in which he describes all minutely. In the monasteries sumptuous objects were made for ecclesiastical use, Limoges becoming the chief centre for enamel work, the process being champlevé generally on copper. In the Gothic thirteenth, fourteenth, and fifteenth centuries, shapes became slighter and more elegant, with more detail and delicacy. Gothic architecture and window tracery penetrated the designs, enamels becoming translucent and modeled in low relief, usually on silver. In the fourteenth century the costumes of the laity began to be luxurious with jewelry. The inventories of Charles V of France and his three brothers—the dukes of Anjou, Berry, and Burgundy—are a revelation as regards the possible extent of personal splendor and ostentation. But the culmination was reached in Flanders under the Burgundian dukes of the fifteenth century—Philip the Good and Charles the Bold—whose court was the richest and most fashionable in all Europe. Pearls and precious stones entered from the Orient at the great port of Bruges, and, as is shown by the portrait painters of the period, garments were sewn thick with them. Especially interesting is the painting by Petrus Christus, of Bruges, known as the "Legend of St. Eloi and St. Godeberta," picturing the interior of a Flemish goldsmith's shop.

Italian Renaissance. Italian Renaissance jewelry merits the high reputation it has always had. During the fifteenth century, while the arts in Flanders, France, Germany, and England were still Gothic, the revival of the classic had already taken place in Italy. In this movement Florence led, though rivaled by Venice, the wealthiest city and most important port in Europe. The goldsmiths emerge from the subordinate status occupied in the mediæval guild, and attain fame as free artists. Many of them become painters, sculptors, and architects, and their trade is regarded as the best apprenticeship for the arts of design. Among the great names are those of Ghiberti, Maso di Finiguerra, Pollaiuolo, Verrocchio, Caradosso, Botticelli, and Ghirlandaio (q.v.). Noteworthy are the intricate settings devised by Botticelli for the neck pendants of the three Graces in his "Primavera." Noteworthy also are the jewels in Ghirlandaio's portrait of Giovanna Tornabuoni, formerly in the Kann and now in the Morgan collection—one worn on the lady's breast, a ruby in claw setting with small beryl above and three pendent pearls below; the other in a recess beside her, a ruby surrounded by two pearls and three beryls, beautifully set and surmounted by a winged dragon with a sapphire over its head.

While the designs of antiquity excel in abstract beauty of form and color, and those of the mediæval craftsmen possess a peculiarly naïve and ingenuous charm, it cannot be denied that the jewels of the Renaissance, enriched with every variety of ornament that the goldsmith could devise, are in their own manner incomparable. Though some by overelaboration may lose balance and dignity, the majority possess qualities rarely found together save at this remarkable period—boldness of conception, richness of form, and extraordinary refinement of technique. Hammering, chasing, casting, and particularly enameling, are all perfectly accomplished. The variety is astonishing. There is none of the monotonous repetition characteristic of most modern jewelry.

The value of Renaissance jewels is independent of their intrinsic worth or the cost of the materials. When the Countess of Châteaubriand was requested to return to Francis I the precious ornaments that were desired by her successor in the royal favor, she sent them to the melting pot first, thus making the gift trivial instead of magnificent. Throughout the best period sculpture is prominent; human and animal figures in relief or in the round find a place on the majority of jeweled compositions; subjects are pictured from history and mythology, religion and romance. Grotesque patterns, like those copied from the unburied frescoes of ancient Rome by Raphael and his pupils for the decoration of the Loggie of the Vatican, are a frequent source of inspiration.

Of sixteenth-century Italian Renaissance jewelry there still exists an abundance, but the sixteenth-century painters, unlike those of the fifteenth century, do not illustrate jewels generously. The foremost name is that of the Florentine goldsmith Benvenuto Cellini (q.v.), whose popularity long caused all the finest examples to be attributed to him, regardless of the facts. If one believes what he himself wrote in the fascinating narrative of his life and adventures, one is tempted to associate him with all the finest creations of his time and to picture his services as competed for by cardinals, popes, and kings. Yet the only quite authenticated example we have of his work as goldsmith is the famous saltcellar at Vienna, the attribution being disputed of jewels such as "Leda and the Swan" at Vienna, the "Chariot of Apollo" at Chantilly, and the mountings of the two cameos, "The Four Cæsars" and "The Centaur and the Bacchic Genii," in the Bibliothèque Nationale at Paris.

Germany. About 1515 the wide circulation of engravings and illustrated books of Italian Renaissance jewelry impelled the German goldsmiths to cultivate Renaissance ornament, and before long the richness of their invention began to overshadow the Italians. Among famous German designers of jewelry are Dürer and Holbein, the former the son of a goldsmith. In Germany, Renaissance ornament lost much of its original purity and became a mixed style composed of strap and ribbon work and intricate architectural motifs.

France. France was the first country to adopt the new Italian style, and from the beginning of the reign of Francis I, French jewelry was closely modeled on Italian, and many Italian jewelers settled and worked in Paris—among them Cellini, from 1540 to 1545. As a collector, Francis I surpassed even Henry VIII and Pope Paul III. But actual examples of French Renaissance jewelry are few, almost the only ones being the wonderful mounted cameos in the Bibliothèque Nationale. Among the chief designers who engraved models for jewelry were Jean Duvet (goldsmith to Francis I and Henri II), Jacques Androuet Ducerceau, Etienne Delaune, René Boyvin, and Pierre Woeiriot.

One of the acquisitions of Henry VIII just before his death was the great pendant of Charles the Bold, the last Duke of Burgundy, captured by a common Swiss soldier from his tent after the memorable defeat at Granson in 1475 and later sold by the magistrates of Bern to a merchant of Augsburg, who sold it to Henry VIII. In the centre was a splendid pyramidal diamond ⅝ of an inch square, surrounded by three large rubies, called the "Three Brothers" from their equality in size and weight, and by four enormous pearls. The last we hear of the famous jewel is in 1623, when James I had it refashioned for the use of Charles and Buckingham on their visit to Spain, the King writing to his son: "I send for your wearing the Three Brethren, that you know full well, but newlie sette."

In the baroque seventeenth century, gorgeousness and glitter rather than color and good design were sought. Stones that had formerly been cut *en cabochon*, or in other simple forms, were elaborated with facets like diamonds, and pearls were in immense demand. Flowers painted in natural colors on enamel and sometimes modeled in relief were the principal decoration of pendants.

Modern. As in the other arts (see INTERIOR DECORATION), so in jewelry, rococo naturalistic designs and unsymmetrical outlines dominated during the first half of the eighteenth century, simple classic forms during the last half. The fashionables of the Directoire who could afford it wore ancient Greek and Roman jewels; the rest, facsimiles of ornaments unearthed at Pompeii or pictured on ancient vase and mural paintings and sculptures. The affected classicism of the Empire stimulated the use of engraved gems, and cameos and intaglios often occupied positions of honor beside important diamonds. The metal work of the early nineteenth century was poor—either pinchbeck imitation or thin and light.

The leader in the revival of jewelry as a personal and individual art at the close of the nineteenth century was René Lalique (q.v.), whose exhibits at the Salon of 1895 and the Exposition of 1900 created a sensation. But the permanent reorganization of the industry depends largely upon the enthusiastic though often inefficient work of Arts and Crafts societies and schools, particularly those of England, Germany, Austria, and the United States. While machine-made jewelry is not necessarily ugly, it is apt to lack the qualities that distinguish good art from bad art. Everything is stereotyped, the different parts being stamped out in quantity by steel dies, especially in imitation jewelry, where stones in paste and glass are mounted on cheap electroplated alloys.

One of the first artistic industries established in the American Colonies was that of the goldsmith, who in every large town produced trinkets for the Indians and popular articles of jewelry, particularly snuffboxes. In 1788 no less than 35 goldsmiths took part in the procession in Philadelphia celebrating the adoption of the Constitution. Providence has long been a jewelry centre. In 1805 four firms there employed 30 men making simple finger rings, gold beads, and silver spoons. Attleboro, Newark, and New York became active a little later, and all four cities produce much cheap jewelry, using alloyed and hammer-plated, and after 1860 electroplated, metals. See PLATED WARE.

United States Statistics. In 1909, according to the thirteenth census of the United States (published 1913), the jewelry industry of the United States was concentrated in the States of Rhode Island, New York, Massachusetts, and New Jersey, and the percentage of the value of the product for that year for the principal centres was as follows: Providence, 25.1 per cent; New York, 23.9; Newark, 16.4; Attleboro, 9.2.

The jewelry industry is one of considerable importance, and the thirteenth census, quoted above, reported that in 1909 there were 1537 establishments engaged in this branch of manufacturing, which includes the working of gold, silver, platinum, gold-filled metals, gold plate, brass, copper, or other metal, with or without precious or semiprecious stones. In addition there were included gold and silver mountings for various articles of more or less utility, and jewelers' findings, as well as statistics of establishments engaged in setting diamonds and other stones and in chasing gold and silver for the trade. The 1537 establishments produced in the year 1909 an output of $80,349,874, of which the cost of materials amounted to $36,674,859, so that there was added by manufacture $43,675,015. The average number of wage earners in the industry was 30,347, and their wages represented a total of $18,357,950.

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JEWELS OF THE MADONNA. See GIOJELLI DELLA MADONNA.

JEW'ETT, CHARLES COFFIN (1816–68). An American librarian. He was born in Lebanon, Me., graduated at Brown University in 1835 and at Andover Theological Seminary in 1840, where, while a student, he acted as librarian. He became librarian at Brown University in 1841 and from 1843 to 1848 was professor of modern languages there. He then became librarian of the Smithsonian Institution and from 1855 until his death was superintendent of the Boston Public Library. He was the first of the modern school of American librarians, and his *Notices of Public Libraries in the United States of America* (1851) and his *Smithsonian Report of the Construction of Catalogues of Libraries* (1853) were of much value and marked a great advance over earlier writings in this field in America. At Boston he prepared the card catalogue of the public library, one of the first instances of the use of the card catalogue in public libraries. Mr. Jewett was president of the first American convention of librarians—that of 1853, held in New York.

JEWETT, MILO PARKER (1808–82). An American educator, born in St. Johnsbury, Vt. He graduated at Dartmouth College in 1828 and at the Andover Theological Seminary in 1833, became professor of rhetoric and political economy two years later in Marietta College, Ohio, resigned in 1838 after adopting Baptist tenets, and in 1839 founded the Judson Female Institute in Marion, Ala., which he conducted until 1855. He then established a seminary for young ladies at Poughkeepsie, N. Y., where he aided Matthew Vassar in planning Vassar College, of which he became the first president in 1862. He resigned his office in 1864 and in 1867 removed to Milwaukee, Wis. His publications include: *Baptism* (1840); *Education in Europe* (1863); *Relations of Boards of Health and Intemperance* (1874); *The Model Academy* (1875).

JEWETT, SARAH ORNE (1849–1909). A writer of stories of New England life, born in South Berwick, Me., Sept. 3, 1849. Miss Jewett, born of New England stock, made her first serious entry into literature in 1869 by publishing a story in the *Atlantic Monthly*. Her books, mainly consisting of short stories and sketches, include: *Deephaven* (1877); *Play Days* (1878); *Old Friends and New* (1879); *Country By-Ways* (1881); *The Mate of the Daylight* (1883); *A Country Doctor* (1884), a novel; *A Marsh Island* (1885), a novel; *A White Heron, and Other Stories* (1886); *The Story of the Normans* (1887); *The King of Folly Island, and Other People* (1888), which contains some of her best work; *Betty Leicester* (1890); *Tales of New England* (1890); *A Native of Winby* (1893); *The Life of Nancy* (1895); *The Country of the Pointed Firs* (1896); *The Queen's Twin* (1899); *The Tory Lover* (1901), an historical novel. Her stories and sketches are admirable in their simple and intimate portrayal of New England character in its finer and gentler moods. Her work is distinguished for its naturalness and is a valuable contribution to the fiction dealing with American life. Consult C. M. Thompson, "The Art of Miss Jewett," in the *Atlantic Monthly*, vol. xciv (Boston, 1904), and *Letters*, edited by A. Fields (ib., 1911).

JEW'FISH'. Any of several groupers of tropical American waters and the largest of the sea-bass family Serranidæ.

1. A guasa (*Promicrops guttatus*), common on both coasts of Mexico and about Florida and the West Indies and known in the vicinity of Pensacola as warsaw (a corruption of guasa,

q.v.). It is a robust species, with a big, flat head and a huge mouth with formidable teeth. It has a voracious appetite. The color of the young is pale olive green, with five crossbars of darker green; but as the fish grows older the general hue becomes dark olive green. It haunts rock places. Ordinary specimens do not often exceed 20 pounds in weight, but one was brought to New York in 1874 which weighed 300 pounds. For illustration, see WARSAW.

2. The black jewfish of Florida, also called warsaw and mero de alto by fishermen, is a related species (*Garrupa nigrita*), which ranges from South Carolina to Brazil, but is not present on the Pacific side of Central America. Few have been examined which weighed less than 100 pounds, and specimens exceeding 500 pounds are recorded. Its color is chocolate brown, varying to blackish gray, without markings, and little paler on the ventral parts, and the fish is a favorite object of sport with rod and line. Consult Holder, *Big Game Fishes* (New York, 1903).

3. On the coast of southern California, an immense fish of the same family and habits (*Stereolepis gigas*), brownish with large greenish-black blotches, and the ventral fins black. It is 5 to 7 feet long, reaches a weight of 500 pounds, and frequents the neighborhood of rocky islands. The flesh of the smaller specimens, often called black sea bass, commands a high price.

JEWISH ART. A term properly applied to art as practiced by the Jews in Palestine before the capture of Jerusalem by Titus, as the conditions of the dispersion afterward did not allow of any independent art. The earliest archæological material known is their pottery, which has been found in considerable quantities, especially at Tell el-Hesy, where Professor Petrie's (q.v) systematic excavations enabled him to distinguish several periods marked by superimposed strata of ruins. His periods are: (1) An Amorite, (2) a Phœnician, and (3) a Jewish period. Jewish designs seem mainly to be copies of Phœnician models, which were themselves copies of other Oriental arts. In the same way the Jewish glyptics were remotely derived, through the Canaanites and Phœnicians, from the glyptics of Babylonia and Assyria; the Hebrew seals, few of which are earlier than the Maccabæan age, varying only by the predominance of floral and geometric design, owing to the aversion of the Jews to reproducing the human figure. Nothing remains of Jewish metal work; carving in wood and ivory and overlaying with metal were practiced, but no works are extant; nor do we know anything of the artistic character of Jewish pictorial decoration, weaving, or embroidery. The tombs near Jerusalem (Tombs of the Kings, etc.) and scattered throughout Palestine are similar to the late Hellenistic and Roman works of their class throughout Syria (see TOMB), and Herod, when reviving the prosperity of Palestine, rebuilding the temple, and founding Cæsarea, with its magnificent structures, frankly adopted the style of Roman art. To this time and to the succeeding century belong the few remaining ancient synagogues in Galilee.

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JEWISH CHAUTAUQUA (shȧ-tą'kwȧ) **SOCIETY,** THE. Conceived and founded in 1893 by its chancellor, Dr. Henry Berkowitz, of Philadelphia, for the "dissemination of a knowledge of the Jewish religion by fostering the study of its history, literature, etc.," this society is modeled on the mother Chautauqua of New York. In 1897 the first assembly was held in Atlantic City, and this focusing of the work has so greatly prospered that the original session of two weeks has now been extended to three. Here the creation of departments for study and entertainment is similar to those of other Chautauquas. More than this, the influence of the society has resulted in the London Jewish Study Society. The official organ was, until 1907, the *Menorah Magazine* of New York, and there is also an *Assembly Record*, published at Philadelphia, besides special series of various publications. The society was incorporated in 1899 and is administered by the following officers: a chancellor, a president, a treasurer, a secretary and director, a field secretary, a board of trustees, and an educational council. The society has a membership of 3000. It conducts a correspondence school and reading circles, for which course books and syllabi are issued dealing with biblical and postbiblical history and literature and the Hebrew language. Consult the *Menorah Magazine* (New York, since 1897); *Special Series No. 7* of the Jewish Publication Society of America (Philadelphia, 1902); *Reports of the United States Commissioner of Education.*

JEWISH EDUCATION. See JEWS.

JEWISH LANGUAGE AND LITERATURE. See JEWS.

JEWISH SECTS. A term applied to certain divergent schools of religious thought and practice, or organized parties, among the Jews.

The *Samaritans* may be regarded as a Jewish sect, inasmuch as they recognized the binding authority of the Law of Moses, but, on the other hand, limited the sacred writings to the Pentateuch, established a cult of their own on Mount Gerizim (see EBAL AND GERIZIM), maintained a certain opposition to the cult in Jerusalem, and took no part in the movements that led to the establishment of rabbinical Judaism. Manasseh, the son of Joiada, is said to have been the first high priest, and the temple to have been built in the days of Alexander; and there is still a small community celebrating every year the Passover on Mount Gerizim. See SAMARITANS.

The *Pharisees* are first heard of in the days of Jonathan (161–143 B.C.), but may have existed for some time then. They were distinguished by their belief in the resurrection and a world to come, intense Messianic expectations, reliance upon angelic ministrations, certain customs of purification, and a tendency to defend apparent deviations from the written Law by an appeal to the "oral Law" claimed to have been transmitted from Moses. In the days of Herod there were 6000 members of this sect. Their views and attitude influenced greatly the later rabbinical development. See PHARISEES.

The *Sadducees* apparently came into existence about the same time as a party banded together to insist upon a literal interpretation of the

Law, to oppose the novel teachings concerning a resurrection from the dead and a world of spirits, to maintain a more conservative type of thought and piety, and to emphasize freedom of the will and moral responsibility. Whether they were called Sadducees because they were "just," organized by one named Zadok, or at first adherents of the Zadokite line of high priests, is uncertain. They ceased to have any influence after the fall of Jerusalem in 70 A.D. See SADDUCEES.

Another sect that probably also grew up in the second century B.C. was the *Essenes.* They formed a kind of brotherhood, chiefly intent upon the exercise of practical virtues and ruled by a severe code of morals. In the time of Philo and Josephus there were several thousand members, some living a stricter monastic life at Engedi, others scattered in various communities, living in matrimony. They believed in a spiritual resurrection, opposed oath taking, the law of retaliation, divorce, and private wealth, and they occupied themselves much with secret books. See ESSENES.

The *Covenanters of Damascus,* a sect arising in the middle of the second century B.C., has been unknown until the publication by Schechter of some of its documents in 1910. He identifies them with the Zadokites described by the Karaite Kirkisani in 637 A.D. It seems to have been after the overthrow of the old high-priestly family that a company of Judæans left their homes and took up their abode in Damascus and the neighboring region. They departed widely from the teaching and practice of the Pharisees, against whom they made many accusations: they forbade divorce; they looked forward to the coming of a Messiah, not from Judah or David's line, but "from Aaron and Israel," consequently a priest; and they regarded it to be wrong to kindle the altar fire and offer sacrifice. They apparently cherished the Book of Hagu and the Book of Jubilees among their scriptures; and the present documents may be as old as the beginning of the first century B.C. See ZADOKITES.

According to Epiphanius, there was a Jewish sect, the *Nasaræans,* living "in Galaaditis, Basanitis, and the region beyond the Jordan," which "existed before Christ and did not know Christ" and differed from other Jews only in regarding the Law of Moses they had as more accurate, refusing to offer sacrifices, and abstaining from animal food. See NASARÆANS.

The *Dositheans* probably go back to pre-Christian times. They show certain similarities to the Zadokites. There is a growing conviction among scholars that *De Vita Contemplativa* is a genuine work of Philo, and consequently the picture of the *Therapeutæ* a description, more or less idealized, of an actual Jewish sect living on the shores of Lake Mareotis, south of Alexandria. It shows marked affinity to the Essenes. See THERAPEUTÆ.

JEWISH YEAR. See CALENDAR.

JEW LIZARD. An agamoid lizard of Australia which, when excited, expands the pouch of its throat into the appearance of a beard; hence often called bearded lizard.

JEW OF MALTA, mạl'tȧ, THE. A tragedy by Marlowe, written at a date which is uncertain, but must have been subsequent to 1588. It was acted between 1591 and 1596 and was first published in 1633, edited by Thomas Heywood. Shakespeare was indebted to Marlowe's play for suggestions in the *Merchant of Venice,* though the plot was mainly taken from other sources.

JEWS (OF. *Geu, Jeu,* Fr. *Juif,* It. *Giudeo,* Ger. *Jude,* Lat. *Judæus,* Gk. Ἰουδαῖος, *Ioudaios,* from Heb. *Yehudah,* Judah). The name of a people belonging to the Semitic family of nations. (See SEMITES.) Originally it designated the members of the tribe of Judah; then the citizens of the Kingdom of Judah, which included various ethnic elements (see JUDAH); later the inhabitants of Judæa under foreign rule or temporarily independent, as under the Hasmonæans (see MACCABEES); and finally, all followers of the Jewish religion, whether they lived in Palestine or were dispersed among the nations, who were descendants of the ancient occupants of Judæa, traced their lineage to any of the tribes of Israel, or were proselytes to the faith. This later usage made it possible to apply the term to the tribes of Israel in earlier times, all the more readily as, after the fall of the independent kingdoms, Israel came to be employed as a designation of the exiles of both, and of all who regarded themselves as the sons of the patriarch Israel. (See JACOB.) Since the term Hebrew was used in early records of Abraham, Joseph, the people of Goshen, and the Israelites in the period of the Judges, though perhaps exclusively by foreigners (see HEBREWS), this also came into vogue as a name of the descendants par excellence of Abraham. Hence Jew, Israelite, and Hebrew have been used indiscriminately in regard to the same people, and the modern attempts to differentiate between them have never been consistently carried out or found a very general recognition. For the sake of convenience the first of these names may here be adopted in its widest sense.

Ethnology. The Jews were long considered as a striking example of a pure, unmixed race. Historical research, however, has tended to show that this assumption was not well founded. Even the earliest traditions suggest a mixed origin. The patriarchs are represented as marrying Aramæan, Canaanitish, and Hittite wives, and some of the tribes, evidently less closely related to the main body, as being the offspring of concubines. The invaders seem to have mixed freely with the various peoples settled in Palestine during the long period of gradual absorption. The racial distinctions between the former and the Canaanites, the Hittites, and the Philistines (qq.v.) were very marked. A mixture of the blond and the brunette races appears to have taken place, similar, though on a smaller scale, to that between the Northern, the Alpine, and the Mediterranean races in Europe. Even the Semitic element is likely to go back ultimately to a blend of heterogeneous stocks. See ARABIA; SEMITES.

It is difficult to determine how nearly related Israel and Judah were. There was always a consciousness of distinction. The difference is striking between the Judæans represented by Egyptian artists in the time of Sheshonk I and the Israelites represented by Assyrians on the obelisk of Shalmaneser III. The genealogical scheme which made Judah a son of Israel seems to have been preceded by the conception that they were brothers (in 2 Sam. xix. 44 the words, "I am the firstborn," have been preserved in the Greek), but such brotherhood need not involve a common origin or even blood kinship at all, as may be seen from Gen. ix. 25, 26, where Shem, Canaan, and Japheth (qq.v.) are represented as brothers. The spread of Yahwe worship to the northern tribes and the union of Israel and Judah in the time of David and Solomon brought them together very closely. Many tribes, most of them of Edomitish origin (see CAIN, CALEB, JERAHMEEL, KENITES, KENIZZITES), were united in the Kingdom of Judah. There does not appear to have been any ban upon intermarriages with foreigners until comparatively late times. The example set by the kings would naturally be followed by the people. The missionary movement, to which the eloquent descriptions of Israel as the Servant of Yahwe in the last chapters of the Book of Isaiah (q.v.) gave such an impetus, brought numerous proselytes to the Jewish fold. To break down prejudices against intermarriage and cordial relations with foreign peoples the books of Ruth and Jonah were written.

It has been shown that a considerable part of the South Russian Jews are the descendants of the Chazars, a people of Turkish origin, who adopted the Jewish religion towards the end of the seventh century A.D. Hence the extraordinarily divergent physical type prevailing among them in spite of a common dialect, a common religion, and freedom to intermarry with other Jews. Wherever the Jews have settled, and particularly in countries where discriminations against them have never existed or have been removed, there are noteworthy admixtures of other blood and approximation in craniological and other somatic characteristics to those of the peoples of their environment. Nevertheless, religious and social isolation and a remarkable assimilative power have tended to produce a distinct type. The modern Jew may be described as short, with dark hair and eyes, rather swarthy skin, somewhat broad-headed, with a characteristic facial expression, full lips, ample beard, etc. (See the Colored Plate under EUROPE, PEOPLES OF.) The majority of ethnologists are agreed that in early times the predominant Semitic (and Jewish) type was dolichocephalic, a type characteristically Arab and preserved by the Jews of Africa and perhaps most of the so-called Sephardim (q.v.).

Among the distinguishing mental and moral traits of the Jews may be mentioned: distaste for hard or violent physical labor; a strong family sense and philoprogenitiveness; a marked religious instinct; the courage of the prophet and martyr rather than of the pioneer and soldier; remarkable power to survive in adverse environments, combined with great ability to retain racial solidarity; capacity for exploitation, both individual and social; shrewdness and astuteness in speculation and money matters generally; an Oriental love of display and a full appreciation of the power and pleasure of social position; a very high average of intellectual ability.

History. 1. *The Earliest Period* (c.2100–c.1440 B.C.).—Native traditions, preserved in song and story, and some allusions in contemporaneous foreign records are the only sources for our knowledge of this period. They are indeed too uncertain and fragmentary to give us anything like a continuous history, yet they may allow us, when taken together, to catch occasional glimpses of actual occurrences or at least to divine the general trend of development that preceded the first important conquests in Syria. For a summary of the traditions, see PENTATEUCH, ABRAHAM, ISAAC, JACOB, JOSEPH, MOSES.

Historians are not inclined at the present time to assume that any real traditions underlie the stories of the creation, the garden of Eden, the antediluvians, the deluge, the tower of Babel, the dispersion of mankind, and the patriarchs from Noah to Abraham. Even Terah, the father of Abraham, is generally identified with the divinity bearing the same name. But the historical character of Abraham is still an open question. It has long been recognized that a foreign source is likely to have been used in Genesis xiv. The Elamitish and Babylonian names inspire confidence (see AMRAPHEL, CHEDORLAOMER, ARIOCH, TIDAL); the identification of Amraphel with Hammurapi (2124–2081 B.C.) is highly probable; the names of the kings of the pentapolis have an Amoritish sound; and the reference to Abram the Hebrew would be natural in a Babylonian or Amoritish document, though it may be explained as a clever archaism. The extent of the source used can only be ascertained by future discoveries. But even if Abraham should prove to be the local numen of Hebron, as some scholars think, it is significant that tradition made him a contemporary of Hammurapi. This may show that somehow a memory was preserved of an early immigration at this time of ethnic elements counted as belonging to the Habiri, or Hebrews. Though Chedorlaomer's name has not yet been found in any cuneiform inscription, an expedition into Syria by an Elamitish king, accompanied by his vassals, is no longer thought incredible. (See ELAM.) The occasion may indeed have been the spread of Hittite power in Syria (see HITTITES) and the consequent invasion of Egypt by the Hyksos, and the first appearance of the Habiri in Palestine may have been more easily remembered because it came at this important epoch.

Some of the Hebrews in the widest sense seem to have established themselves in the following centuries east of the Dead Sea and in Mount Seir. The fact that not only a list of eight Edomitish kings earlier than Saul, but also of dukes reigning in Edom before them, has been handed down in Genesis xxxvi, may indicate that some of them were settled east of the Arabah (q.v.) long before the tribes of Israel invaded the East Jordan country. They also seem to have overflowed into the Negeb (q.v.). Tradition likewise ascribed to Moab kings at an early date, and Ammon probably settled its land not much later. None of these peoples, though reckoned as kinsmen, were thought of as having gone down into Goshen. There is nothing improbable in the settlement of a part of the Habiri in Goshen, the land southwest of the Negeb extending towards the Nile (see GOSHEN) during the Hyksos period, possibly as early as in the nineteenth century B.C. That Jacob-her appears as the name of one of the Hyksos kings can scarcely be an accident. It would be natural to suppose that these Habiri were driven east of Goshen when the Hyksos were expelled from Egypt and pursued to Sharuhen in 1575 B.C., even though no reliance be placed upon the traditions recorded by Manetho, and that they continued to lead their nomadic life in the land of Midian, having successfully escaped their pursuers to the other side of the Gulf of Akabah. Towards the end of this period some of them seem to have been settled around Kadesh Barnea (q.v.).

Scholars are divided in their judgment as to the great figure to whom tradition ascribed so important a rôle at this time. While some maintain that Moses was the leader of his people from Egyptian territory first to Sinai, then to Kadesh, and finally to the East Jordan country, and an oracle giver with whom at least the Decalogue (q.v.) in its earliest form originated, others regard him as the mythical ancestor of the Levitic priesthood at Kadesh Barnea. No criterion has yet been found by which any part of the Pentateuchal legislation can be separated from its Palestinian background and vindicated as the product of Moses's pen; the story of his life in Exodus and Deuteronomy shows such manifest mythical motives, later recasting and successive expansions, and is at any rate so overlaid with legendary embellishments, that no conclusive verdict can be reached (see Pentateuch), and there exists at present no external testimony worthy of consideration. (See Moses.) But whatever view is taken of Moses's personality, this phase of the nomadic or seminomadic people's life must, in view of the later development of the Yahwe cult fostered by the Levites, be considered as marking an epoch.

2. *The Invasion of Syria and the Judges* (c.1440–c.1050 B.C.).—It may have been at the time of Egyptian weakness after the death of Thothmes III in 1447 that Israelitish tribes invaded the country occupied by the Amoritish kings Sihon of Heshbon and Og of Edrei in Bashan. The memory of this earliest forcible invasion of Syria was preserved in the Song of the Crossing of Arnon (Num. xxi. 14, 15), the Song of the Capture of Be'er (xxi. 17, 18), and the Song of Sihon's Conquests (xxi. 27–30). There is no evidence that these lyrics reflect later historic situations, and our present knowledge of the Amorites (q.v.) has increased the probability of these kingdoms and their overthrow. Three tribes—Reuben, Gad, and Manasseh—took possession of the country north of the Arnon and east of the Jordan, though subsequently Reuben was driven out of the part of Moab once held by Sihon. Other tribes pushed their way across the Jordan, and towards the end of the fifteenth century B.C. the Habiri began to make themselves felt in Palestine, as the Tell el-Amarna tablets (see Amarna Letters) indicate. From the account in Judges i, it is evident that the Canaanite, Amorite, and Hittite population was by no means exterminated, but that the Israelitish tribes wedged their way into the country and only gradually gained the upper hand and secured possession of the land. Cities were indeed besieged and battles fought, but connubial and commercial relations were also established. The transition to agricultural and urban life was necessarily a slow process. A comparison of the Amarna correspondence with the Book of Joshua suggests that the situation presented in the former is earlier than that in the latter.

The battle of Gibeon referred to in an old song taken from a collection called the Book of Jashar (Josh. x. 13) may have been fought c.1350 B.C. Paul Haupt ("Die Schlacht von Taanach," in *Studien Julius Wellhausen gewidmet;* Giessen, 1914) has plausibly conjectured that the famous battle described in the Song of Deborah (Judg. v) took place in 1250 B.C. towards the end of the reign of Ramses II (1310–1244). Six tribes participated in this battle: Naphtali, Issachar, Zebulon, Ephraim, Machir, and Benjamin. These, with Reuben, Gilead, Gad, Dan, and Asher, mentioned in the song, evidently formed the confederacy of Israel. Judah, Simeon, and Levi were apparently not counted as a part of Israel. An Egyptian hymn of victory coming from the fifth year of Meren Ptah (c.1240) describes his conquests in Syria over Hittites, Canaanites, and Israelites. The statement, "Israel, his people are few, his seed exists no more," is, of course, an exaggeration, but may indicate a serious defeat for the confederacy, possibly soon after the battle on the Kishon, while Ramses II was still alive. In the reign of Ramses III (1200–1169) the Philistines, whose home was in Caphtor (Crete), attacked Egypt, and being repulsed settled on the coast of Syria. As long as they were occupied with subduing the Canaanites, they were looked upon by the Hebrews as rendering a good service. See Japheth.

The tribes of Israel were exposed to raids from the east by Moabites, Ammonites, Midianites, and Minæans. Against them leaders from one tribe or another went forth with such forces as they could gather. When they were successful, they brought deliverance, respite for a while from similar invasions, and prestige for themselves. Such leaders of bands were called *shofetim,* as they were termed *shapiti* by the Assyrians; in Tyre and Carthage the chief magistrates were designated as *shofetim, suffetes,* and in course of time the heroes of this period—Ehud, Barak, Gideon, Jephthah, and even Samson—appeared in the light of "judges" of all Israel. One of these warriors, Abimelek, became city king in Shechem, but was not able to maintain himself. Sometimes the tribes that constituted Israel made war upon one another (Judg. xix–xxi). When the Philistines had firmly established themselves in their pentapolis, they set out to conquer the whole land that has been named after them Palestine. Israel was subdued, probably in the first part of the eleventh century B.C.

The transition from seminomadic to agricultural life naturally affected the religious ideas and practices. As the various tribes came into possession of fields and vineyards, they felt the necessity of seeking the favor of those local numina, male and female, who were supposed to have given the rain and the sunshine in the past; and as they took over the sanctuaries, the sacred trees and fountains, and the high places, they worshiped there many "lords" (Baalim) and many goddesses (Ashtaroth) whose individual names have not come down to us. The later historians were well aware of the flourishing polytheism of this period, and from their standpoint regarded the foreign invasions, the oppression by enemies, and the general distress of the time as punishments for this worship of many gods. Some peculiar facts, such as the extreme rarity of names compounded with Yahu (see Jehovah), have led scholars to question whether this deity was at all worshiped in Israel during this period. But it is significant that the priesthood at Dan traced its descent to Jonathan, a name compounded with Yahwe, and considered this Levite as the grandson of Moses; that the father of Gideon, Joash, has a name of the same type; and that, if any of the extant witnesses to the text can be trusted, Yahwe was used in the Song of Deborah. Since Dan appears to have been settled "where the stream breaks forth" already at the time of the battle of Taanach, it would seem probable that the Levites had been driven from their homes around Kadesh Barnea, perhaps at the same time when the Simeonites were driven out of their cities in the Negeb by the Jerahmeelites, before the middle of the thirteenth century B.C. With the Levites the Yahwe cult may have spread to Dan, Ophrah, Shiloh, and many other centres. There is indeed nothing to prevent the assumption that, in spite of the worship of a multitude of gods, the Yahwe cult was already at this time felt to some extent to be a bond of union between the tribes of Israel. It may, however, have taken a somewhat deeper root in Judah, though we unfortunately know very little about this tribe before David.

3. *The United Kingdom* (c.1050–953 B.C.).—The deliverance from the Philistine yoke came through Saul, a Benjamite, who was proclaimed King by the prophet Samuel (q.v.), and his valiant son Jonathan. Saul seems to have been the first to unite all the tribes of Israel, and it is probable that what was then the tribe of Judah, south of Jerusalem, also formed a part of his Kingdom. This is indicated both by the fact that there were Judæan warriors, like David and his brothers, with Saul, and by the war he fought with the Amalekites in the Negeb. How long Saul reigned is not known, since the text in 1 Sam. xiii. 1, which now reads "Saul was one year old when he began to reign, and he reigned two years over Israel," is manifestly corrupt. He fell in the battle of Mount Gilboa c.1033 B.C. The Philistines regained control of a large part of the Kingdom, but east of the Jordan, at Mahanaim, Saul's son Ishbaal maintained himself for seven years. Meanwhile David (q.v.) had built for himself a kingdom, with Hebron for its capital, made up of heterogeneous elements—Calebites, Kenites, Kenizzites, Jerahmeelites, and Judæans—known as the Kingdom of Judah. After the murder of Ishbaal (c.1026) he came into possession of Israel. His general, Joab, captured for him Jerusalem from the Jebusites, and from this capital his power spread to the adjoining countries. He conquered the Aramæan states of Zobah, Beth Rehob, Ishtob, and Maacah, held the Amalekites in check, and incorporated Edom, Ammon, and Moab in his empire. He was in league with Hamath, Geshur, and Tyre. His son Solomon (c.993–953 B.C.) divided his kingdom into 12 administrative districts, built a royal temple in Jerusalem and many palaces, caused dissatisfaction and serious insurrections by the heavy taxation necessary to carry out his building enterprises, undertook an expedition to Ophir, and had relations with Hiram of Tyre, the King of Egypt (possibly Pesebkhenno II), and the Queen of Sheba, who may have sought an alliance with him against the Minæans. The weakness of the Egyptian, Hittite, Assyrian, and Babylonian kingdoms, and the unusual qualities of Saul, David, and Solomon, made it possible to develop and to maintain for nearly a century this Hebrew power in Syria.

4. *The Kingdom of Israel* (c.953–c.723 B.C.).—Under the leadership of Jeroboam I (c.953–932 B.C.), Israel, forming the bulk of the nation, seceded. Jeroboam made Shechem his capital and showed special favor to the ancient temples at Bethel and Dan. The invasion of Syria by Sheshonk I (c.948 B.C.) seems to have affected Israel as well as Judah. His son Nadab (c.932–930) was overthrown by Baasha (c.930–906), a strong ruler who fixed the capital at Tirza. Ela (c.906–904) and Zimri (c.904–903) were followed by Omri (c.903–872), a very capable ruler, who made Samaria his capital, waged war with Damascus, and conquered Moab, as the Mesha inscription attests. Ahab (c.872–851) gained a notable victory over Damascus, capturing Bar Hadad I and obtaining valuable commercial advantages for Israel in the Aramæan capital. He took part in the coalition of Syrian states against Shalmaneser III, sending 10,000 men to the battle of Karkar (854). His alliance with Tyre was sealed by a marriage to Jezebel, daughter of Ito Baal. The erection of a Melkart temple in Samaria led to the struggle with Elijah (q.v.). Ahab fell on the battlefield at Ramoth-Gilead. His sons Ahaziah (c.851–849) and Jehoram (c.849–843) succeeded him. Mesha of Moab revolted in the time of Jehoram, and a punitive expedition ended in defeat after Mesha had resorted to the sacrifice of his son to save his capital.

The dynasty was overthrown by Jehu (c.843–814), who murdered the Queen mother and many members of the royal family, established the Yahwe cult by massacre of the priests of Melkart and destruction of their temple, paid tribute to Shalmaneser III of Assyria in 842 B.C., and lost the East Jordan country to Hazael of Damascus. Joahaz (c.814–797) was practically a vassal of Bar Hadad II of Damascus. The later weakness of Bar Hadad II, who was defeated by Adadnirari V (812–783) and by Zakir, King of Hamath, allowed Joash (c.797–782) to reconquer much territory in the east and the north. He also fought with Amaziah, whom he took prisoner, and captured Jerusalem. The long reign of Jeroboam II (c.782–740) witnessed further expansion and a sudden accession of wealth that led to industrial slavery of the lower classes. Prophets like Amos and Hosea appeared urging justice and equity and predicting disaster. Zechariah (740) and Shallum (740) could not maintain themselves, Menahem (740–737) only with the support of Assyria. In the time of Pekahiah's (737–735) successor, Pekah (735–734), a league was formed with Rezin of Damascus, and an attempt was made to force Ahaz of Judah to unite with them. He appealed to Tiglath-pileser IV (745–728), who captured the East Jordan country and a part of Galilee. Hoshea (734–725) revolted and surrendered himself in 725, while his city was probably taken, as the Babylonian Chronicle suggests and the Hebrew records declare, by Shalmaneser V, apparently in the year 723. Sargon II (722–705) carried away about 27,290 people. Yet there was a revolt again in 720.

The exiled Israelites were placed in various towns in Mesopotamia and Media. The bulk of Israel unquestionably remained in the land. To take the place of the exiles, four Arabic tribes from Hejaz were sent to Samaria in 715. Later Asurbanipal (668–625) sent deportations from Babylon, Kutha, Sippara, Awwa, and Hamath. The mixed population worshiped many gods, but the Yahwe cult continued and gained in strength. This was no new thing, since the worship of other gods had always coexisted with the worship of Yahwe in Israel. If some of the remaining Israelites felt the attraction of the new gods, many of the newcomers were anxious to learn the manner of the god of the land to whom the sacred places had belonged. Concerning the Assyrian, and later Chaldæan, Province of Samaria we know very little. The raids made upon the sanctuaries at Bethel and in the cities of Samaria by Josiah (2 Kings xxiii. 15–20), if historical, are not likely to have affected profoundly the religious life. It is not improbable that the later cult community at Shechem (see SAMARITANS) was chiefly made up of old Israelitish families who had adhered to a stricter worship of Yahwe. As for the exiles in Mesopotamia and Media, they were probably absorbed in the native population, though there is no reason to doubt that some of them may have continued, even in a foreign land, to worship Yahwe, and their descendants may subsequently have drifted into communities of Judæan exiles. The search for "the lost ten tribes" has been occasioned by the false conception that the entire population was carried away and yet maintained its ethnic peculiarities, and has been encouraged by fanciful combinations that lack all scientific value.

5. *The Kingdom of Judah* (c.953–586 B.C.).—The secession of Jeroboam and the establishment of the Kingdom of Israel left to the house of David little more than the founder of the dynasty had possessed before the death of Ishbaal. The chief additions were Jerusalem, with the adjoining territory of Benjamin and the suzerainty over Edom. But the fine capital with its temples and palaces, the Negeb with its ancient shrines, the alp land beyond the Arabah with its Judæo-Edomitish population, the traditions of the great rulers, David and Solomon, and the attachment to Yahwe, somewhat stronger in Judah than in Israel, were valuable assets. Rehoboam (c.953–937), whose headstrong policy led to the disruption, saw his capital invaded by Sheshonk I (c.948). This raid, however, does not seem to have had any permanent effect. He left his reduced territory to Abijam (c.937–934). Asa (c.934–877) made an alliance with Bar Hadad I of Damascus. Jehoshaphat (c.877–848) allied himself with Jehoram of Israel and attempted to send an Ophir expedition from Ezion Geber. Jehoram (c.848–845) lost Edom, and Ahaziah (c.845–843) was murdered by Jehu. Athaliah, the daughter of Ahab and Jezebel, reigned c.843–836. By a coup d'état of Jehoiada, a powerful priest, Joash came into power (c.836–796). He was assassinated, as was his successor, Amaziah (c.796–777), who reconquered Edom. Uzziah (c.777–737) seems at first to have been a vassal of the King of Israel, Jeroboam II. He became a leper, and Jotham was appointed coregent. After his death Jotham reigned alone (c.737–735). In the time of Ahaz (c.735–715) Pekah and Rezin threatened Judah, to force this state into the union against Assyria, but Ahaz preferred to pay tribute to Tiglath-pileser IV, before whom he appeared in person at Damascus (732 B.C.). His reign probably saw both the humbling of Israel by this Assyrian King and the final capture of Samaria by Shalmaneser V in 723 and Sargon II in 720. Hezekiah (c.715–686) may have been in league with Ashdod against Assyria in 711, and certainly received an embassy from Merodach Baladan (Mardukapaliddin) of Babylon and took part in a general revolt which led to Sennacherib's invasion in 701.

The influence of the prophet Isaiah was strongly felt in the reigns of Ahaz and Hezekiah, and Micah also appeared at this time. A reaction against the teaching of these prophets took place in the days of Manasseh (c.686–639). He seems to have adopted a policy of submission to Assyria, favored Assyrian customs, and given much offense to the prophets and their followers by introducing new features into that polytheistic worship which had never been suppressed in Judah. As his reign was long, peaceful, and prosperous in spite of this policy, it was quoted a century later, by those who preferred other gods, as an evidence against the profitableness of worshiping Yahwe. (See JEREMIAH.) His son Amon (c.639–637) was followed by Josiah (c.637–608). In 625 the Scythians, having come to the rescue of their allies, the Assyrians, by relieving the siege of Nineveh, swept on through Syria to punish Psammetichus I, who had invested Ashdod, a city over which Assyria claimed authority. Jeremiah and Zephaniah interpreted their coming as betokening Yahwe's purpose to punish through them the people of Judah for their sins. In 620 a law book was found in the temple (see DEUTERONOMY) which caused Josiah to destroy other sanctuaries and kill their priests, while centralizing the Yahwe cult in Jerusalem. He died in the battle of Megiddo, defending his Assyrian liege lord against the invasion of Necho II of Egypt. His son Jehoahaz (c.608) was made King by the people, but removed by Necho II after three months. The Egyptian King then made another son of Josiah, Jehoiakim, ruler (c.608–597). In collecting the tribute imposed by Necho he had resort to a taxation so heavy as to be oppressive, and yet he undertook to build by forced labor a palace ceiled with cedar and painted with vermilion, for which he was severely censured by Jeremiah. The prophet Uriah was slain for rebuking the King. It may have been after a battle at Carchemish between Necho and Nebuchadnezzar II of Babylon (probably in 605) that Jehoiakim paid tribute for three years to the Chaldæan King; then he revolted, though Nebuchadnezzar did not have opportunity to undertake his punishment until 597. He escaped, however, the fate foretold by Jeremiah and intended by Nebuchadnezzar, as he died in peace at Jerusalem; but Jehoiachin (597) was carried away to Babylonia with 10,000 citizens of Jerusalem (2 Kings xxiv. 14).

Zedekiah was made King. He entered into a league with Apries (Hophra) of Egypt, and there was a strong party in Jerusalem who favored armed opposition to the Chaldæan suzerain. Jeremiah was persecuted for denouncing this policy, but his fears were realized. After an unsuccessful sortie Zedekiah was captured, saw his sons killed before him, and was then blinded. The city was bravely defended, but finally taken in 586; 74 prominent men were put to death by Nebuchadnezzar, 834 were carried away captive from Jerusalem in 586, and possibly 3023 Jews from the surrounding country in the same year, if 7 is an error for 17 in Jer. lii. 28, as Ewald suggested, and finally 745 Jews were carried away by Nebuzaradan in 581, probably after another insurrection (Jer. lii. 29–30). Either in 586 or in 581 the temple was burned with fire. Gedaliah was made Chaldæan governor of the land in 586 and took up his residence at Mizpah, but was slain two months later by Ishmael b. Nethaniah of the seed royal. Under the leadership of Johanan b.

Kareah some Jews fled to Egypt and settled at Tahpanhes for fear of the consequences of this murder. The number is not given, but it can scarcely have included "all the remnant of Judah," as 745 Jews were deported to Babylonia in 581; and it is thought by some scholars that, even after these deportations and emigrations, the bulk of the population of the Kingdom of Judah still remained in the land under Chaldæan rule.

6. *The Chaldæan and Persian Periods* (586–332 B.C.).—The fall of Jerusalem, the destruction of the temple, the overthrow of the Davidic dynasty, and the deportation or flight of thousands of citizens threatened the Jewish people with extinction. It was saved by the fact that these things had been foreseen by the prophets. Their oracles were proved true by the events, and this enhanced their prestige; their conception of Yahwe, his justice, indifference to the cult, and purely ethical demands, tended to give assurance that their religion could live, even though the temple was gone, and "the remnant" they foresaw might turn to Yahwe, preserve its distinctness, and gain prosperity, even though the independence of the nation was lost.

When Amil Marduk in 561 removed Jehoiachin from his prison and "set his throne above the thrones of the kings that were with him in Babylon" (2 Kings xxv. 28), new hopes were aroused, and it is thought by some scholars that it was the birth of a child to this scion of the long-lived Davidic dynasty that inspired the pictures of the coming monarch in Isa. ix. 1–6; xi. 1–10. Collections of prophecies were made, and to the ancient denunciations many a word of good cheer was added. The Pentateuch in its earliest form, as a connected whole, beginning with the stories of Genesis and ending with the laws and exhortations of Deuteronomy, is likely to have appeared at this time, though many changes and additions may belong to a subsequent period. (See PENTATEUCH.) In Nabunaid's reign (556–539) the career of Cyrus filled the Jews everywhere with lively expectations. These may be seen in Isaiah xiii–xiv, xxi and, in the opinion of many scholars, also in xl–lv, though the references to Cyrus here may possibly be secondary. (See ISAIAH.) In December, 539, Babylon fell into the hands of Cyrus. In 537 he is said to have given permission to the Jews to return to Palestine. Their condition was such (see BABYLONIAN EXILE) that it is extremely doubtful whether a considerable number took advantage of this opportunity. Furthermore, there is no hint of returned exiles in the prophecies of Haggai and Zechariah, and Neh. i. 2, 9 clearly indicate that in the fifth century B.C. the inhabitants of Jerusalem were regarded as "those remaining there after the captives had been carried away."

But in the time of Darius Hystaspis the temple was rebuilt. This sanctuary, which was less magnificent than Solomon's temple, but became the home of a purer worship, was completed in 516. Zerubbabel was then Persian governor, and from Zechariah's prophecies it may be inferred that certain hopes of national independence clustered around this Davidic descendant, so that even a golden crown was sent from Babylonian Jews for the coronation. What became of Zerubbabel is not known. In the twentieth year of Artaxerxes, Nehemiah was sent as governor to Jerusalem with authority to rebuild the walls of the city. The Elephantine Papyri (q.v.) have rendered it probable that his sovereign was Artaxerxes I, and consequently the year of his appointment 445 B.C. In spite of many obstacles he succeeded in accomplishing his purpose. Ezra (q.v.) obtained permission from Artaxerxes to return with a company of his countrymen, 1754 in number, in the seventh year of the King's reign. As only the name is given and there were three kings with this name, it is not certain whether Artaxerxes I is meant or Artaxerxes II. Most scholars think of the former, but there is much to be said in favor of the latter. The date would be either 458 or 398. Ezra is described as "the writer of the Law." This may mean anything from a mere copyist to an author; it quite probably indicates that he not only copied the Pentateuch as it was in his time, but also amplified and edited it. This law book seems to have been adopted as the official code. According to Josephus (*Ant.*, xi, 7), the temple was defiled and many Jews enslaved by Bagoses (or Bagoas), probably in 383; and an early chronologist (preserved in Syncellus, i, 486) tells of the participation of the Jews in the insurrection against Artaxerxes III and the exile of many to Hyrcania by the Caspian Sea and to Babylonia (c.350 B.C.). The fortification of the city by Nehemiah and the national feeling engendered by Ezra's measures against mixed marriages prepared the way for this rebellion. Characteristic of the period was the development of a theocratic form of government with the high priest for its head and the Pentateuch as the law of the land. This theocracy was more democratic than the earlier monarchical régime. While the Book of Ezekiel, sections of the Book of Isaiah, and the Memoirs of Nehemiah and Ezra, as well as some cuneiform documents, allow us to catch glimpses of the life of the exiles in Susa, Babylon, and Nippur, on the Chebar and the Ahava, the Elephantine Papyri have given us a more intimate knowledge of a Jewish community at the southern end of Egypt, having its own Yahu temple, its syncretistic form of religion, its peculiar standards and customs, while in contact with both Jerusalem and Samaria and cognizant of what was going on in these places; and these papyri are dated in various years of the fifth century B.C.

7. *The Macedonian Period* (332–143 B.C.).—Alexander met with serious resistance in Syria only at Tyre and Gaza. The Jews submitted quietly to the new ruler. There is no real evidence that he visited Jerusalem, but it cannot be said to be improbable. His policy resembled that of Cyrus. He was prepared to conciliate the nations he conquered and permitted them to retain as much liberty as was consistent with a recognition of Macedonian supremacy. This liberty was extended to the religious cult, with which Alexander was careful not to interfere. In fact, he seems to have been particularly anxious to visit famous shrines and to gain the favor of influential priesthoods. He may have learned something concerning the Jews through his teacher Aristotle and been curious to see their sanctuary. After Alexander's death his empire went to pieces, and his generals fought for the several parts. Laomedon at first secured the satrapy of Palestine and Phœnicia, but Ptolemy, the son of Lagus, who had become satrap of Egypt, dispossessed him in 320 B.C. Antigonus deprived him of these provinces in

315, but they were restored after the battle of Ipsus in 301 to Ptolemy, who in 305 had assumed the title of King. Many Jews left Palestine for Egypt in the time of Ptolemy I, and soon the Jewish colonies in Egypt far outnumbered those in Babylonia.

The Egyptian dispersion, destined to be of vast importance in the development of Judaism and Christianity, gradually spread from the delta in the north to the boundaries of Ethiopia in the south, over Cyrenaica to the territory of Carthage. The Jews in Alexandria are said by Josephus (*Ant.*, xii, 3, 1) to have enjoyed equal political rights with the Macedonians. Duchesne (*Origines du culte chrétien*, p. 2; Paris, 1889), Willrich (in *Beiträge zur alten Geschichte*, vol. iii, pp. 403 ff.; 1903), and Wellhausen (*Israelitische und jüdische Geschichte*, pp. 225 ff.; 7th ed., Berlin, 1914) maintain that Josephus has used a misleading term to indicate the privileges of religious freedom and separate jurisdiction which they enjoyed, and that they could not have had the citizen's franchise and a share in the government, since they were unwilling to take part in the official cult. On the other hand Schürer (*Geschichte des jüdischen Volkes*, vol. iii; Leipzig, 1909) holds the testimony of Josephus and Philo to be decisive and thinks of the Jews as forming separate *φύλαι, phylai*, not bound to observe the official religious ceremonies in exercising their rights as citizens. The decision is difficult. There can be no doubt, however, that they often rose to high positions in the state. Their artisans and workmen were held in esteem. While there is no record of any Jew having occupied a chair in the University of Alexandria, the fact that it was a Museum, a temple to the muses, with an officiating high priest, may have served as a bar. A somewhat extensive literature seems to have been produced, including the Greek translation of the Hebrew Scriptures, begun in the reign of Ptolemy II Philadelphus (285–247), a work of extreme difficulty and of very great importance. This version naturally estranged the people more and more from the language of the fathers; it became a standard of style as well as an authority in matters of faith and gave rise to a large number of religious or philosophical writings. As Palestine was a province of Egypt until 200 B.C. the Hellenizing influence was felt even among the Aramaic-speaking Jews there, especially in Jerusalem. It makes itself noticeable in the wisdom literature. Ptolemy III (247–221) was favorable to the Jews, but Ptolemy IV (221–204) seems to have reversed this policy.

Ptolemy V (204–181) lost Palestine and Cœle-Syria after his general, Scopas, had been defeated by Antiochus III at Panium in 200 B.C. The Jews were treated less generously by the Seleucid rulers than by the Ptolemies. Seleucus IV (187–175) sent Heliodorus to plunder the temple in Jerusalem (2 Macc. iii. 7–40). At this time a priestly family, the Tobiads, rose to power and influence, vying with the high-priestly family of the Oniads. When Antiochus IV Epiphanes (175–164) came upon the throne, Onias III was forced to flee to Antioch, and the Tobiads supported against him his brother Jason, who sought the King's favor by introducing Hellenic customs, but after three years (174–171) was overthrown. Menelaus, a member of the Tobiad family, was then recognized by Antiochus as high priest and continued to further the Hellenizing process. The aristocracy of Jerusalem fell in with the King's strong desire that Greek customs, and even Greek religion, should everywhere in the empire supplant what appeared to him as barbarous ideas and practices. But the rivalry of the parties for position caused a revolt in favor of Onias. Menelaus, however, was reinstated by Antiochus on his return from his first Egyptian campaign in 169 and remained in office until 162. The King entered the temple and confiscated some of its treasures as punishment for the rebellion. The following year, after he had been humiliated in Egypt by Popilius Lænas, he sent Apollonius to take further measures. His force must have met with opposition, for the walls and some of the houses were torn down, many were put to death, and others fled, leaving only the "apostates," i.e., the Hellenists and the foreigners. The Akra, or citadel, was rebuilt and provided with a garrison. The temple was partly destroyed and then dedicated to Zeus Olympius, whose altar, or image, was placed on the great altar of Yahwe. A royal decree was sent from Antioch ordering the cessation of the Yahwe cult, prohibiting the celebration of sabbaths and festivals, as well as the performance of circumcision, and commanding that all copies of the Law be delivered up and burned. Altars were built in every village, images of the gods erected, and the Jews were forced to offer impure sacrifices and to observe Greek rites. This took place in 168.

But deliverance came through Mattathias, son of Johanan, of the family of the Hasmonæans, and his three sons—Judas, surnamed Maccabæus, Jonathan, and Simon. Mattathias lived at Modein, near Lydda. When called upon to sacrifice to the Greek gods, he refused and slew the first Jew who complied. With a band of followers determined to defend themselves even on the Sabbath, he began a rebellion which was continued, after his death in 166, by Judas. Judas defeated Apollonius, then Seron at Beth-Horon, then Nicanor and Gorgias at Emmaus, and finally Lysias himself in 165. The city of Jerusalem was taken, and the temple rededicated to Yahwe in December, 165, though the citadel remained in the hands of the Seleucids. After the death of Antiochus IV an attempt to capture the Akra itself forced Lysias to action. He defeated Judas at Beth-Zechariah, took Beth-Sura, and besieged the temple mountain in 163. The Jews suffered much, but Lysias treated them generously; Menelaus was deposed, and Alcimus made high priest in 162. This last high priest of the Zadokite line was driven away by the Maccabees; Nicanor was sent with an army to reinstate him, but was defeated in March, 161, at Adasa. It was probably in 160 that Judas fell in a battle with Bacchides at Elasa. Jonathan became the leader. He sided with Alexander Balas (q.v.) and was made high priest in 152 and meridarch at the wedding of Alexander and the Egyptian princess in Ptolemais in 150. He fought for Balas until 145 and then sided with Demetrius, whom he defended with 3000 men in his own capital and who recognized his position. Subsequently he left Balas for Trypho and drove the troops loyal to Demetrius out of Ashkelon, Gaza, and Beth-Sura. Finally, Jonathan was suspected and arrested by Trypho, who later executed him at Baskama. The full independence of Judæa was effected by his successor, Simon.

8. *The Hasmonæan Period* (143–63 B.C.).—On the coins which signalize the sovereignty of the Hasmonæan rulers 170 Sel., i.e., 143/2 B.C., is counted as the first year of Simon. It was not, however, until 141 that the Akra was captured and the Seleucid garrison driven out. But he was the founder of the dynasty, and events were dated in the years of his reign as in ancient times. He made a treaty with the Romans and cared for his people, until he was murdered at Dok by his son-in-law Ptolemy in 135. His son John Hyrcanus (135–104) was attacked by Antiochus VII Sidetes in 130, and Jerusalem was forced to capitulate, the walls were razed, Joppa and Gezer were ceded, and John must take part with Antiochus in the Parthian campaign, from which he probably gained his surname Hyrcanus. But Antiochus lost his life and his eastern provinces in 129, and John Hyrcanus was able not only to recover independence, but also to increase the boundaries. He conquered Medaba and Samaga, subdued Shechem, and is said to have destroyed the temple on Mount Gerizim; and he took possession of Idumæa, i.e., the territory south of Judah, and forced the inhabitants to become circumcised. With the aid of the Romans he also maintained himself against Antiochus IX and conquered the Greek city of Samaria. His son Aristobulus I (103–102), who assumed the title of King, conquered some Ituræans and forced them to adopt the Jewish religion. His brother Alexander Jannæus (102–75) extended the borders of Judah in the Philistine plain and the East Jordan country. His kingdom compared favorably with that of David, for while the ancient territory of Edom was now in the hands of the Nabatæans, the powerful Philistine cities now Hellenized were, with the exception of Ashkelon, conquered or held by him. The Pharisaic party called in Demetrius III Eucerus and with the aid of the Macedonian soldiers defeated their King in battle (88 B.C.), but 6000 men deserted from the camp of the victors and defeated the rest. Alexander crucified 800 Pharisees as a punishment, and then went forth on new campaigns, from which he returned in triumph three years later. He advised his widow, Salma Alexandra (75–67), to live in peace with the Pharisees. This she did and governed prudently for nine years. In her time probably falls the organization of the Sanhedrin (q.v.) as a "collegium" having among its members scribes and Pharisees. Alexandra's sons Hyrcanus II and Aristobulus II (67–63) became rivals. As Alexandra could not be high priest, Hyrcanus had during her reign occupied this position. Since he was the first-born he became King, but after a few months Aristobulus conquered him with Arab troops and made himself ruler. Hyrcanus, however, at the instigation of Antipater, an Idumæan, the father of Herod, fled to the Nabatæan King Aretas, who was induced by the promise of a cession of the territory that had been acquired by Alexander Jannæus to take up arms on his behalf. This led to the interference of the Romans, who were then fighting both in Syria and Armenia. Jerusalem was captured in 63 B.C. by Pompey, who had decided in favor of Hyrcanus, and Judæa was made dependent on the Roman Province of Syria.

The Maccabæan uprising and the Hasmonæan kingdom were of great importance for the future of the Jews. They awakened a keen national sentiment. Not only freedom had come, but also power. The little people felt itself to be in the midst of the conquest of the world. In vain would the nations rebel against Yahwe and his anointed, the King in Zion. If he was not of the seed of David, Yahwe had placed him on the throne of David, and the promises to David applied to him; if he was not of the seed of Aaron, he had the zeal of Phinehas; he was a king and priest after the order of Melchizedek. The Psalter reflects the eschatological mood. Out of this grew the hope of a future Messiah, either a king who should be a genuine descendant of David (cf. the Psalms of Solomon), or a priestly ruler, a descendant of Aaron and Israel, as the Covenanters of Damascus desired. (See JEWISH SECTS.) A new zeal for the Law also developed as a consequence of the attempts by enemies of the Jewish religion to destroy this treasure. This created an eagerness to collect and edit all other sacred books. The perils passed of a Hellenization that would have robbed the Jews of their distinctive religious life without enabling them to make any other contribution that could compensate for so serious a loss.

9. *The Roman Period* (63 B.C.–395 A.D.).—Pompey established the Roman power in Syria. Hyrcanus was appointed ethnarch and high priest. Aristobulus, his two sons, Alexander and Antigonus, and two daughters were carried captive to Rome. In 54 B.C. Crassus plundered the temple, which Pompey had piously spared. He fell shortly afterward in the war against the Parthians, and his companion, Cassius Longinus, succeeded in completely routing the army of Aristobulus, who had been released by Cæsar. Meanwhile the war between Cæsar and Pompey broke out. In Syria the partisans of the latter were numerous and contrived to poison Aristobulus and execute his son Alexander, who were Cæsareans (49 B.C.). After the death of Pompey, however, Hyrcanus, or rather Antipater the Idumæan (who was both his minister and master), saw the necessity of securing the favor of Cæsar. With Hyrcanus II ended the line of Hasmonæan princes, who had exercised, at least nominally, supreme authority both in the civil and religious affairs of Palestine, though in the time of Alexandra the real religious authority had passed into the hands of the priesthood, and especially of the Sanhedrin. The Idumæan (Herodian) dynasty, which succeeded the Hasmonæan, virtually commenced with Antipater, who prevailed on Cæsar to restrict Hyrcanus to the high-priesthood and obtained for himself the office of procurator of Judæa, while his eldest son, Phazael, was appointed governor of Jerusalem, and his youngest son Herod governor of Galilee. The Jewish or National party took alarm at this sudden increase of Idumæan power, strife ensued, and ultimately Antipater perished by poison; but Herod, by the assistance of the Romans, finally entered Jerusalem in triumph (37 B.C.) and caused Antigonus, the last male representative of the Hasmonæan line and his most dangerous enemy, to be put to death.

After Herod's death (4 B.C.) Archelaus, one of his sons, ruled Judæa, Samaria, and Idumæa as ethnarch; Antipas, another son, became tetrarch of Galilee and Peræa; and a third son, Philip, became tetrarch of Trachonitis. But the arbitrariness and cruelty of Archelaus made him hateful to the people, and Augustus, listening to their just complaints, banished him to Vienne in Gaul (6 A.D.). Judæa was now ruled by Roman procurators. During the government of the first of these, Coponius, the party of the Zealots arose among the Jews, founded by Zadok and Judas of Galilee, who protested against the taxes imposed by the Roman government as a sinful servitude. In 28 A.D. John the Baptist appeared as a prophet. He was suspected of political motives, wrongly no doubt so far as he was himself concerned, though some of his disciples may have cherished ambitions for him, and he was put to death by Herod Antipas in 29 A.D. Already before the death of Herod, probably in 6 B.C., Jesus of Nazareth had been born. After the death of John the Baptist he appeared independently as a prophet, proclaiming the advent of the kingdom of heaven on earth and set forth and illustrated the principles of righteousness implied in God's government over human society. He did not favor rebellion against Roman rule and apparently had no ambition to become a Messiah or King of Israel, but was wrongly charged with this and put to death under Pontius Pilate. The precise year when this event occurred, which has had an incalculable influence on the history of the Jews, is not known, but it must have been between 29 and 36 A.D.

In the year 38 the Emperor Caligula issued an edict ordering divine honors to be paid to himself as Cæsar. Everywhere throughout the Roman dominions the Jews refused to obey. The order was given to Petronius, the Roman governor of Syria, to use violence if necessary in setting up the statue of the Emperor in the temple at Jerusalem. At Alexandria a massacre took place, and for a moment it seemed as if all the inhabitants of Judæa, too, were doomed to perish; but Herod Agrippa I, tetrarch of northern Palestine and a friend of Caligula, dissuaded the Emperor from carrying out his design. Petronius did not enforce the Emperor's order and escaped punishment through the murder of Caligula in 41. The accession of Claudius, on the assassination of Caligula, seemed the dawn of a brighter day. Herod Agrippa, a loyal friend and favorite of the new Emperor, obtained the dominion over all the parts once ruled by his grandfather Herod, and many privileges were through his influence granted to his Jewish subjects and even to foreign Jews. They received the rights of Roman citizenship (41 A.D.), and Herod even tried to conciliate their religious prejudices by the strictness with which he observed their law; yet the National party remained in an almost permanent state of mutiny, while the followers of Jesus suffered persecution at the hands of Herod. After the death of Herod Agrippa I, his son being but a youth of 17, the country was again subjected to Roman governors. The land was overrun by robbers and assassins, some of whom professed to be animated by religious motives, while others were mere ruffianly freebooters and cutthroats; the antipathy between Jews and Samaritans waxed fiercer and fiercer, and the latter waylaid and murdered the orthodox Galileans as they went up to worship at Jerusalem; all sorts of impostors, fanatics, and pretenders to magic made their appearance; the priesthood was riven by dissensions; and the hatred between the populace and the Roman soldiery (mostly of Græco-Syrian origin) increased. In 66, in spite of all the precautionary efforts taken by Agrippa, the party of Zealots burst into open rebellion, which was terminated (70) by the conquest of Jerusalem by Titus, the destruction of the temple, and the massacre and banishment of thousands of Jews, who were scattered among their brethren in all parts of the world. The defense of Jerusalem, as narrated by Josephus, is a magnificent example of heroism. Considerable numbers were allowed to remain in their native country, and for the next 30 years, although both hated and treated with rigor, they appear, on the whole, to have flourished. The Emperor Nerva was lenient to them as to the rest of his subjects, but as soon as they had attained some measure of political vitality their turbulent spirit broke out anew. Their last attempts to throw off the Roman yoke, at Cyrene (115), Cyprus (116), Mesopotamia (118), and Palestine under Simon Bar Cochba (132–135), were defeated after enormous butchery. The suppression of Bar Cochba's insurrection by the capture of Bethar, the great stronghold of the Jews (135), marks the final desolation of Judæa and the dispersion of its inhabitants. The whole of Judæa was laid waste, and it is said that about 985 towns and villages lay in ashes, and 50 fortresses were razed to the ground; the new city founded by Hadrian on the site of Jerusalem was named Ælia Capitolina, and on the site of the temple a sanctuary in honor of Jupiter Capitolinus was erected, containing an equestrian statue of the Emperor Hadrian. The hardships to which Jews were subjected were again alleviated in the reign of Antoninus Pius (138–161), whom the Jewish writers represent as secretly attached to their religion. Heliogabalus (218–222) patronized Jewish practices, such as circumcision and abstinence from swine's flesh. Alexander Severus (222–235) also placed Abraham on the same level as he did Christ and obtained from the grateful people the title of "father of the synagogue." Generally speaking, from the close of the second century till the establishment of Christianity under Constantine, when their hopes were once more dashed to the ground, the Jews of the Roman Empire appear to have prospered. In this period falls the redaction of the chief code and basis of the oral Law, the Mishna, completed by Jehuda Hanasi (the prince), or Hakadosh (the holy), president of the great school at Tiberias (150–210)—upon which code were grafted subsequently the two gigantic commentaries or complements, the Palestinian and Babylonian Gemaras.

The Babylonian Jews were even more fortunate than their western brethren, though they did not perhaps attain the meridian of their prosperity till the establishment of the Persian dynasty of the Sassanids in 226, after the downfall of the Parthian dynasty. Their leader was called the Prince of the Captivity and was chosen from among those held to be descended from the house of David. He lived in great splendor and was even permitted to exercise political functions in the Jewish community. The Jews of Babylonia were wealthy and pursued all sorts of industrial occupations. They were merchants, bankers, artisans, husbandmen, and shepherds and had the reputation of being the best weavers of the famous Babylonian garments. The reputation for learning of the Babylonian schools, Nehardea, Sura, and Pumbeditha, was very great. Their condition at this time farther east is uncertain, but it seems possible that they had obtained a footing in

China at quite an early date. They were discovered there by the Jesuit missionaries of the seventeenth century, especially at Kai-fong-fu, where they had a large synagogue. They followed in their prayers and observances rabbinical Judaism, having remained in close connection with their brethren in Persia. The tablet inscriptions in their synagogues were in the Persian language. In 1901 certain Jews in Shanghai entered into communication with the very few who had preserved their identity. In Europe the ascendancy of Christianity proved baneful to the condition of the Jews. Imperial edicts and ecclesiastical decrees vied with each other in the rigor of their intolerance towards all who did not accept Christianity. The Jews were prohibited from making converts, from invoking (in Spain at least) the divine blessing on the country, from marrying Christian women or holding Christian slaves; they were burdened with heavy taxes; yet despite persecution, they seem to have flourished. They are found in large numbers in Illyria, Italy, Spain, Minorca, Gaul, and the Roman towns on the Rhine; they were agriculturists, traders, and artisans and held land. Constantius, during whose reign a fierce insurrection incited by his Coregent Gallus broke out among the Arians and Jews (353), terms them, in a public document, "that most hateful of all people"; yet in spite of this we find them filling important civil and military positions and exercising the influence that springs from the possession of wealth and knowledge. The brief rule of Julian (361–363) even shed a momentary gleam of splendor over their destinies, and he appears to have favored the rebuilding of the temple at Jerusalem. The death of the Emperor frustrated this plan. The establishment of Christianity as the official religion of the Empire in 378 and the suppression of all other forms of religion exposed the Jews to serious persecutions. When Theodosius died in 395 and divided his empire between his two sons, Arcadius and Honorius, the Jews in the East, except those under Sassanid rule, became subject to the Emperor in Constantinople, those in the West to the Emperor in Rome.

10. *The Byzantine Period* (395–622).—Within the Byzantine Empire the Jews were subject to much restrictive legislation and were frequently harassed by their Christian neighbors. In 418 they were excluded from the military service; in 429 the patriarchate at Tiberias was abolished; in Egypt the Jews as well as the pagans were persecuted by Cyril of Alexandria. In the time of Justinian (527–565) there were constant struggles between Christians and Samaritans as well as between Christians and Jews, and the Emperor issued decrees against both. It is interesting to observe that he recommended the oldest Greek version, permitted the use of Aquila, but forbade the elders to give the haggadic exposition after the reading of the lesson from the Law. In Italy, Sicily, and Sardinia the Jews were for the most part unmolested. In the sixth and seventh centuries the Franks and the Visigoths in Spain inflicted on them frightful persecutions. In Persia the Jews were treated well under Sassanid rule. After the destruction of Jerusalem by Titus many fugitives had settled in Arabia, and by the year 300 they had become quite powerful in Yemen and elsewhere. About 360 the Aksumite King Ela Amida conquered Yemen. When he was driven out in 378, Jewish influence became paramount. The Himyarite kingdom of Dhu Nuwas was a Jewish kingdom. It was overthrown in 525 by Elesbaha, King of Aksum (see ETHIOPIA), with the aid of the Sabæan and Hadramautian rulers. This gave the Christian religion a firmer hold on South Arabia and probably drove some of the Jewish communities farther north.

11. *The Jews in the Moslem World* (622–).—At first Jewish tribes around Mecca and Medina were favorably regarded by Mohammed, but when it became evident that they would not accept Islam, they had to pay dearly for their loyalty to their own faith. Mohammed subdued the Khaibar tribes in 627, and most of the Arabian Jews removed to Syria and Mesopotamia. The spread of Mohammedanism through western Asia, the Mediterranean regions, Africa, and Spain was, nevertheless, advantageous to the Jews. Excepting incidental persecutions, such as those in Mauritania (790) and in Egypt (1010), they enjoyed under the caliphs and Arabian princes comparative peace. In Moorish Spain their numbers increased greatly, and they became famous for their learning, as well as for commercial and industrial activity. They were husbandmen, landed proprietors, financial administrators, counselors, secretaries, astrologers, or physicians to the rulers, and were untrammeled in the exercise of their religion. This period may well be considered the golden age of Jewish literature. Poets, orators, and philosophers arose among them, and to them and the Arabs is due no small share in the preservation and subsequent spreading of ancient classical literature, more especially philosophy, in Europe. In Babylonia the Jews were also for a long time treated well by the Ommiad and especially the Abbaside caliphs. But as the caliphate passed into the hands of rulers hostile to them, persecution began even there. Before the end of the eleventh century the rabbinical schools were closed, the best of the community had fled to Spain, and those that remained were reduced to an abject condition from which they have never risen. In Italy, where they were settled in large numbers in Bari, Taranto, and Otranto, their position was made tolerable by pecuniary sacrifices.

The spread of the Turkish power came to the Jews in Asia Minor as a relief from the persecutions that had been started by the Byzantine Emperor Basil II (957–1025) and continued by several of his successors. The Crusades brought sufferings not only to the Jews of the Occident, but also to those who were found in the East. After the fall of the Byzantine Empire in 1453 the Jewish communities began to grow in its chief cities, the Osmanli Turks granting them freedom of worship, though often withholding from them other rights, such as that of purchasing and holding real estate. They were allowed to reopen their schools, to establish synagogues, and to settle in all the commercial towns. Among the Jews expelled from Spain at the end of the sixteenth century many found their way to the Levant. There are to-day considerable communities in Constantinople, Adrianople, Smyrna, Aleppo, Damascus, and other cities. In Palestine they are rapidly increasing. Only a minority can now trace their descent to the refugees from Spain in the time of Isabella I; the majority are recent immigrants from eastern Europe, Bohkara, and Yemen. There may be 100,000 Jews in Palestine to-day, more than one-half of them in the city of Jerusalem.

In spite of the efforts of their European and American brothers to ameliorate their condition, most of them are very poor. Much has been done in recent years to furnish educational facilities and opportunities for economic betterment to the rising generation. The number of Jews in Arabia is not very large, yet they enjoy some independence. Those in Persia have in the last centuries sunk into ignorance through oppression and the general sluggishness prevailing in that country. Jews are found in Afghanistan and carry on trade between Kabul and China, and in Bokhara, where they possess equal rights with the other inhabitants and are skilled in the manufacture of silks and metals. They are also found in considerable numbers in Tunis, Algiers, Tripoli, and Morocco, where they have had colonies for perhaps more than 1000 years, which were largely reënforced in consequence of the great Spanish persecutions. They are especially numerous in Fez and Morocco, though they are often shamefully treated. In Egypt they are comparatively few in number at the present time, the only important communities being in Alexandria and Cairo. On the Abyssinian Jews, living in the midst of a Christian population itself surrounded by Moslem neighbors, see FALASHAS.

12. *The Jews in Mediæval and Modern Europe* (622–).—While Mohammed was making his appeal to the Jews of Medina, their brethren were suffering for their faith in Spain, defending it in Italy, and seeking converts for it in Russia. They were destined to be relieved of their sufferings and have a long period of prosperity in Spain through the influence of the faith Mohammed preached, to buy toleration in Italy in an age which saw papacy reach the climax of its power, and to make converts to their own faith of the whole kingdom of the Chazars, the greatest power in Russia. As they pushed their way from land to land in Europe their career was almost everywhere one of alternating prosperity and adversity, toleration and bitter persecution. Their lot in *France* during the eighth and ninth centuries was quite favorable, especially in Paris, Lyons, Languedoc, and Provence. They possessed lands and houses and, in the south, held public offices. Their Talmudic schools flourished. At the court of Louis le Débonnaire (814–840), who maintained as a principle the obligation to protect all his subjects, irrespective of their faith, they acquired great influence. Before long, however, under his successors, kings, bishops, feudal barons, and even the municipalities joined in a carnival of persecution. From the eleventh to the fourteenth century, especially during the religious excitement wrought by the Crusades, their history is a series of massacres. All manner of wild stories were circulated against them; it was said that they were wont to steal the Host and to stick it contemptuously through and through, to inveigle Christian children into their houses and murder them, to poison wells, etc. Occasionally their debtors, high and low, had recourse to what they called Christian religion as a very easy means of getting rid of their obligations. Thus Philip Augustus (1180–1223), under whose rule the Jews seem to have held mortgages of enormous value on the estates of church and state dignitaries, simply confiscated the debts due to them, forced them to surrender the pledges in their possession, seized their goods, and banished them from France; the decree appears to have taken effect chiefly in the north; yet in less than 20 years the same proud but wasteful monarch was glad to let them come back and take up their abode in Paris. Louis IX, who was a very pious Prince, among other religious acts canceled a third of the claims which the Jews had against his subjects, "for the benefit of his soul." An edict was also issued for the seizure and destruction of their sacred books, and we are told that at Paris (1242) 24 carts filled with copies of the Talmud, etc., were consigned to the flames. In the reign of Philip the Fair they were again expelled from France (1306) with the usual accompaniments of cruelty; but the state of the royal finances rendered it necessary, 10 years later, under Louis X, to recall them; and they were allowed to enforce payment of the debts due to them, on condition that two-thirds of the whole should be given up to the King. The semireligious disorders, known as the rising of the shepherds, which broke out in Languedoc and the central regions of France (1321), were signalized by horrible massacres of the Jews. (See PASTORELS.) In the following year the plague broke out, and the wildest crimes were laid to their charge. They were held responsible, likewise, for the Black Death which appeared in 1348. In whole provinces every Jew was burned. At Chinon a deep ditch was dug, an enormous pile raised, and 160 of both sexes burned together. Yet Christianity never produced more resolute martyrs than these Jews, who met their tortures chanting hymns of rejoicing. Finally, Sept. 17, 1394, they were indefinitely banished from central France.

The first appearance of the Jews as traders in *England* dates from the period of the Saxons. They are mentioned in the ecclesiastical constitutions of Egbert, Archbishop of York, 740. The first real settlement was made under William the Conqueror, who, with his son William Rufus, favored them; the latter, on the occasion of a public debate between them and the Christians, even swore with humorous profanity that if the rabbins beat the bishops, "by the face of St. Luke" he would turn a Jew himself. The same reckless monarch carried his contempt for the religious institutions of his Kingdom so far that he actually farmed out the vacant bishoprics to the Jews; and at Oxford, even then a seat of learning, it has been surmised that they possessed three halls—Lombard Hall, Moses Hall, and Jacob Hall—where Hebrew was taught to Christians as well as to the youths of their own persuasion. As they grew in wealth they grew in unpopularity. On the day of the coronation of Richard the Lion-Hearted (1189) some foreign Jews being perceived to be witnesses of the spectacle, from which their nation had been strictly excluded, a popular commotion against them broke out in London; their houses were pillaged and burned. Sir Richard Glanville, the Chief Justice of the realm, acting under the orders of the indignant King, partially succeeded in arresting the havoc and even in bringing some of the mob to justice (three were hanged). Similar scenes were witnessed at Norwich, Edmundsbury, Stamford, and York; in the last of these towns most of the Jews preferred voluntary martyrdom in the synagogue to forced baptism. When Richard returned from Palestine, though they were still treated with great rigor, their lives and wealth were protected for a consideration. John at first covered them with honor; but the popular and priestly hatred only became the stronger, and the vacillating King turned on his protégés, after they had accumulated wealth, and imprisoned, maltreated, and plundered them in all parts of the country. Under Henry III, accused of clipping the coin of the realm, they had as a penalty to pay the royal exchequer (1230) a third of their movable property. The unfounded stories of the crucifixion of the Christian boys, William of Norwich (1144) and Hugh of Lincoln (1255), roused the populace against the Jews. Some efforts were made to induce them to give up their profession of usury, as was also done in France and elsewhere during the same period; but they were so heavily taxed by the governments of Christendom, and at the same time so completely debarred from almost every occupation, that they could find no other means of subsistence. The attempt made by the Dominican friars to convert them failed utterly, and in 1253 the Jews—no longer able to withstand the constant hardships to which they were subjected in person and property—begged of their own accord to be allowed to leave the country. Richard of Cornwall, however, persuaded them to stay. Ultimately, under Edward I in 1290, they were driven from England, pursued by the execrations of the infuriated rabble, and leaving in the hands of the King all their property, debts, obligations, and mortgages. They emigrated for the most part to France and Germany, though it has been shown that some remained behind and managed to conceal themselves from the authorities. The number of Jews in England at the time of the expulsion is estimated at about 16,000.

In *Germany* they were looked upon as the special property of the sovereign, who bought and sold them, and they were designated his *Kammerknechte* (chamber servants). About the eighth century they were found in all the Rhenish towns. In the tenth century they were in Saxony and Bohemia; in the eleventh, in Swabia, Franconia, and Vienna; and in the twelfth, in Brandenburg and Silesia. The same sort of treatment befell them in the Empire as elsewhere; they had to pay all manner of taxes and to present gifts, to mollify the avarice or supply the necessities of emperors, princes, and barons. Only here and there did they possess the rights of citizens or were they allowed to hold immovable property. Repeatedly the emperors gratified at once their piety and their greed by canceling the Jews' pecuniary claims. In many places they were compelled to live in a certain part of the town, known as the *Judengasse* (Jews' street) or ghetto. As elsewhere in Christendom, so in Germany, the Crusades kindled a spirit hostile to the "enemies of Christ." The word *hep* (said to be the initials of *Hierosolyma est perdita*, Jerusalem is taken) throughout all the cities of the Empire became the signal for massacre, and, if a fanatic monk sounded it along the streets, it threw the rabble into paroxysms of murderous rage. The Jews were expelled, after being plundered and maltreated, from Vienna (1196), Mecklenburg (1225), Breslau (1226), Brandenburg (1243), Frankfort (1241), Munich (1285), Nuremberg (1390), Prague (1391), Mainz (1420), Saxony (1432), Bavaria (1450), and Regensburg (1476).

Switzerland, whither they came at a comparatively late period, began to persecute them about the middle of the thirteenth century. They were expelled from Bern (1288), Zurich (1436), Geneva (1490), Basel (1576), and Schaffhausen (in the fifteenth century).

In *Spain*, as we have seen, the condition of the Jews was long favorable. During the whole of the brilliant period of Arab and Moorish rule in the peninsula they were almost on terms of equality with their Mohammedan masters, rivaled them in letters, and probably surpassed them in wealth. Nor was this state of things confined to those portions of Spain under the sovereignty of the Moors; the Christian monarchs of the north and interior gradually came to appreciate the value of their services, and we find them for a time protected and encouraged by the rulers of Aragon and Castile. But the extravagance and consequent poverty of the nobles, as well as the increasing power of the priesthood, ultimately brought about a disastrous change. Gradually the Jews were deprived of the privilege of living where they pleased, their rights were diminished, and their taxes augmented. In Seville, Cordova, Toledo, Valencia, Catalonia, and the island of Majorca outbursts of priestly and popular violence took place (1391–92); immense numbers were murdered, and wholesale theft was perpetrated by the religious rabble. Escape was possible only through flight to Africa or by accepting baptism at the point of the sword. Many thousands became enforced converts to Christianity, though many of these, known as *Maranos*, secretly continued to profess the rites of the Jewish religion. In 1480 the Inquisition was introduced. Hundreds of Jews were burned at the stake. Sometimes the popes, and even the nobles, shuddered at the fiendish zeal of the inquisitors and tried to mitigate it; but in vain. At length the hour of final horror came. In 1492 Ferdinand and Isabella issued an edict for the expulsion, within four months, of all who refused to become Christians, with the strict inhibition to take neither gold nor silver out of the country. The Jews offered an enormous sum for the revocation of the edict and for a moment the sovereigns hesitated, till Torquemada, the Dominican Inquisitor General, dared to compare his royal master and mistress to Judas. To the number of 300,000 (some even give the numbers at 650,000 or 800,000) they resolved to abandon the country, which a residence of seven centuries had made almost a second Judæa to them. Almost every land was shut against them. Some ventured into France; others into Italy, Turkey, and Morocco, in the last of which countries they suffered the most frightful privations. Of the 80,000 who obtained an entrance into *Portugal* on payment of eight gold pennies a head, but only for eight months to enable them to obtain means of departure to other countries, many lingered after the expiration of the appointed time, and the poorer were sold as slaves. In 1496 King Emmanuel commanded them to quit his territories, but he at the same time issued a secret order that all Jewish children under 14 years of age should be torn from their mothers, retained in Portugal, and brought up as Christians. Agony drove the Jewish mothers into madness; they destroyed their children with their own hands and threw them into wells and rivers, to prevent them from falling into the hands of their persecutors. The miseries of those who embraced Christianity, but who for the most part secretly adhered to their old faith, were hardly less dreadful, and it was far on in the seventeenth century before persecution ceased. Suspected converts were burned as late as 1766 in Portugal and 1821 in South America.

The wanderers appear to have met with better treatment in *Italy* (and Turkey) than elsewhere. During the fifteenth and sixteenth centuries they are to be found—except at intervals of persecution—in almost every city in Italy, chiefly engaged in money lending. Abrabanel, perhaps the most eminent Jewish scholar and divine of his day, rose to be confidential adviser to the King of Naples. The invention of printing, the revival of learning, and the Reformation are generally asserted to have been beneficial to the Jews; but this can be regarded as true only in a limited sense. When the Jews began to use the presses at their earliest stage for their own literature, sacred and otherwise, the Emperor Maximilian was urged to order all Hebrew writings to be committed to the flames, and but for the strenuous exertions of Johann Reuchlin (q.v.), ignorance, treachery, and bigotry might have secured a triumph. Luther, in the earlier part of his career, looked with no unfavorable eye on the adoption of violent means for their conversion; but, on the other hand, we find at least one distinguished Roman Catholic, Pope Sixtus V, animated by a far more wise and kindly spirit towards them than any Protestant prince of his time. In 1558 he abolished all the persecuting statutes of his predecessors, allowed the Jews to settle and trade in every city of his dominions and to enjoy the free exercise of their religion, and in the administration of justice and taxation placed them on a footing with the rest of his subjects. That the Reformation itself had nothing to do with subsequent ameliorations in the condition of the Jews is plain from the fact that in many parts of Germany, Protestant as well as Catholic, their lot became actually harder than before. They were driven out of Bavaria (1553), out of Brandenburg (1571), and similar treatment befell them elsewhere. What really caused the change in their favor was the great uprising of human reason that marked the middle of the eighteenth century.

Holland was one of the first countries in modern times to rise out of the barbarism of the Middle Ages. As early as 1593 it permitted Jews to settle and trade, though they did not acquire the rights of citizenship till 1796. Holland, therefore, became a refuge in the seventeenth century, of which the Spanish Maranos availed themselves; and by the middle of that century Amsterdam had a considerable Jewish population, renowned for its learning and enterprise. Nor has there been any instance of persecution of Jews in Holland from the time of their entrance to the present day, except such as orthodox Jews themselves indulged in against "heretics," e.g., the cases of Gabriel Acosta and Spinoza (qq.v.).

In *England* the edict of Edward I remained in force for more than 300 years, though Jews are known to have lived secretly in London and to have had a synagogue there during the whole of this period. The first attempt made by the Jews to obtain a legal recognition in England was during the Protectorate of Cromwell in 1655. (See MANASSEH BEN ISRAEL.) Cromwell himself was favorable to their admission; so were the lawyers; but the nation generally, and particularly the emphatically religious portion of it, were strongly hostile to such a proceeding; and the wearisome, controversial jangling of the divines appointed to consider the question prevented anything from being done till the reign of Charles II, who, standing much and frequently in need of their services, permitted them quietly to settle in the land. In 1723 they were permitted to give evidence in courts of justice; in 1753 they obtained the right of naturalization. Since 1830 civic corporations, since 1833 the profession of advocate, and since 1845 the offices of alderman and of Lord Mayor have been opened to them. The last triumph of the principle of toleration was achieved in 1858 by the admission of Jews into Parliament. In the year 1885 Lord Rothschild took his seat as a member of the House of Lords, and in 1914 Sir Rufus Isaacs became Lord Chief Justice of England.

Some of the exiles from Spain and Portugal found their way into *France*, where they long lingered in a miserable condition. In 1550 they were received into Bayonne and Bordeaux; they were also to be found in considerable numbers in Avignon, Lorraine, and Alsace. In 1784 the capitation tax was abolished. In 1790, in the early period of the French Revolution, the Jews presented a petition to the national representatives, claiming full rights as citizens. Mirabeau was among their advocates, and their cause was not unsuccessful. From this time their technical designation in France has been *Israélites*. In 1806 the Emperor Napoleon summoned a Sanhedrin of Jews to meet in Paris, to whom a variety of questions were put, mainly with a view to test their fitness for citizenship. Their answers were satisfactory, and they were allowed to reorganize their religious institutions in the most elaborate manner. No material change has since taken place in the laws regarding them, though since 1895 anti-Semitism has been very virulent in France and was especially noteworthy in connection with the case of Alfred Dreyfus (q.v.).

Jews appeared in *Russia* at an early date; in the seventh century the ruler of the Chazars and part of his people were converted to Judaism. During the Middle Ages, as in most countries of Christendom, they were received, persecuted, and banished. Admitted into Russia proper by Peter the Great, they were expelled—to the number of 35,000—by the Empress Elizabeth in 1742. The partition of Poland (1772–95) brought a large Jewish population under Russian sway. Readmitted by Catharine II into Russia proper, they were further protected by Alexander I, who in 1805 and 1809 issued decrees insuring them full liberty of trade and commerce; but of the liberties which he conferred upon them they were deprived by the Emperor Nicholas. After 1835 a scheme of gradual emancipation was entertained by the government and was partially carried out by Nicholas I and Alexander II. But the reaction under Alexander III, due to the influence of Pobiedonostseff, procurator of the Holy Synod, was of the direst consequences to the Jews. From the year 1881 and the promulgation of the Ignatieff Law of 1882, the most restrictive measures have been piled up against them. They have been confined to one huge ghetto—the Pale of Settlement—and since 1891 the laws have been applied with the utmost severity. The Jews have been forced out of all offices of trust and from nearly all the professions, restricted in the use of schools and universities, and have been forced to live in the direst poverty and neglect. Their only hope lies in conversion to the Orthodox faith or in emigration. Fully 800,000 have sought safety in flight and have settled in various parts of Europe and America. Many have benefited by the munificence of the late Baron Maurice de Hirsch (q.v.), from whom the Jewish Colonization Association received many millions of dollars. The Jews are more numerous in Russia than in any other part of the world, being found mainly in those portions of the Empire which formed part of the ancient Kingdom of Poland, and the governments nearest to these territories. As early as 1264 the Jews enjoyed in Poland and in Lithuania certain important privileges. They were favored by Casimir the Great of Poland (1330–70), because of the love he bore to a Jewish mistress. After 1348 their numbers were swelled by fugitives from Germany and Switzerland. For many years the whole trade of the country was in their hands. During the seventeenth century and the greater part of the eighteenth, however, they were much persecuted and sank into a state of great ignorance and poverty; but education—in spite of the severity and barbarism of Russian intolerance—has, since the French Revolution, made great progress among them.

Frederick the Great of *Prussia* showed himself singularly harsh towards the Jews. All manner of taxes were laid upon them, only a certain number were allowed to reside in the country, and these were excluded both from the most honorable and the most lucrative employments. This condition was ended by the Prussian edict of toleration (1812), by which the Jews were placed almost in an equal position as citizens with other Prussians. Thereafter the tendency was to enlarge their liberties, and the revolution of 1848 finally gained them full emancipation, although, owing to the subsequent reaction, it was slowly carried out. But a few years after the formation of the German Empire a new kind of anti-Jewish persecution took its rise, under the name of anti-Semitism (q.v.), and from Germany it spread to Austria, Belgium, Switzerland, and France. It was started as a political move, the promoters desiring to discredit the Liberals and Socialists through the Jews. The old blood accusation has often been revived, and the Jews have been gradually forced out of all offices of public trust and of government appointment. In the smaller German states full rights were likewise legally conceded to the Jews. The first German national assembly, held in Frankfort in 1848, contained many prominent Jewish members. In *Austria* the Emperor Joseph II distinguished himself by passing an act of toleration (1782). This act was extraordinarily liberal in its provisions for the Jews. Not till 1867, however, did they acquire the right to possess land. The anti-Semitic agitation has been exceedingly strong in Austria, and attempts have been made (1890–96) to reënact former restrictive measures, especially in Vienna, where an anti-Semitic board of aldermen existed for many years. In *Hungary* the Jews, who had long enjoyed important privileges and who had been protected by the nobility, were emancipated at the time of the revolution of 1848, in which they were patriotic to a man. In that Kingdom they are on an absolute equality with the Christians. The Jews have lived in *Rumania* (Moldavia, Wallachia) since the thirteenth century. They have not fared better there than in other parts of Europe. The severest persecution came over them during the last quarter of the nineteenth century. In spite of the Treaty of Berlin (1878) the government refused to naturalize the Jews and has gradually forced them out of all but a few employments and driven them altogether from the schools. The financial and economic crisis of 1899 and 1900 made the lot of Rumanian Jews unbearable, and they have been forced to leave the country in large numbers. *Spain* began to tolerate the Jews again in 1837, and they can follow trade or agriculture like other Spaniards; but few Jews have as yet cared to venture back to a land that is filled with mournful recollections. *Portugal* has about 400 Jews, and the Jewish religion is legally tolerated there. *Switzerland* long treated them harshly, but while they now enjoy full personal liberty in all cantons, popular ill will has interfered with the exercise of some of their religious observances. In *Denmark*, since 1814, they have been on a footing of equality as citizens with native Danes. In *Sweden* they obtained admission into Stockholm and three other cities in 1776 and have since been admitted to citizenship on the same basis as native Swedes. In *Norway* they were not admitted until 1860, but now enjoy all the rights of citizenship.

Jews at an early date settled on the *American* continent, exiled from Spain and Portugal, or taking part in the Dutch and English enterprises in the New World. In the sixteenth century we find some in Brazil, whither they had been sent in company with convicts. In 1642 a large number of Portuguese Jews came from Amsterdam and settled in Pernambuco and Surinam. From here they spread to Guadeloupe, Cayenne, and Curaçao. The strong arm of the Inquisition was felt also in Brazil, and many were compelled to comport themselves as Christians (Maranos) or to emigrate to the West Indies. There were Jews in New Amsterdam as early as 1652; others came from Brazil in 1654. They were not heartily welcomed, and therefore betook themselves to Newport and Providence, R. I. The Newport congregation was strengthened by fresh arrivals from Lisbon (1755) and Curaçao. The old synagogue there is still standing. At the end of the seventeenth century there were some Jews in Maryland. Pennsylvania, Georgia, and the Carolinas were the next places of settlement. This was during the first half of the eighteenth century. During the struggle for independence the Jews attached themselves to the nation under whose wing they had thus found protection. There were nine Jewish signers of the nonimportation resolution drawn up in Philadelphia in 1768. Jews were in the Charleston regiment of militia, and three Jews served on the staff of De Kalb. Haym Solomon enjoyed an enviable reputation as one who aided the Continental Congress with his money. Forty-four Jews figured in the War of 1812, 58 in the Mexican War, and in the War of the Rebellion they were to be found in large numbers both on the Northern and Southern sides. During the nineteenth century the Jews spread over the whole extent of the United States, and important congregations have also grown up in the larger cities of Canada. From 1830 to 1870 the immigration came largely from the southern states of Germany and from Hungary. The riots and persecutions in Russia have driven hundreds of thousands of Jews to the United States. To these have been added large numbers from Galicia and Rumania, who have for the most part settled in the large business centres; though efforts have been made to found agricultural colonies for them in Delaware, New Jersey, the Dakotas, Pennsylvania, Connecticut, and also in Argentina.

Judaism at the Present Time. In taking a rapid survey of the Jews as they exist to-day, we see at one and the same time a great diversity coupled with a fundamental conformity. This diversity has arisen from the attempt which the Jew is bound to make to fit his ancient beliefs and ceremonies into modern ways of thinking and modern conditions. Outwardly the Jews may be divided into two distinctive classes, the so-called *Ashkenazim*, or the descendants of the Jews of middle and eastern Europe, and the *Sephardim*, or descendants of the Jews who lived formerly in Spain and Portugal. Brought up under different conditions, the Sephardim had the benefit of a general culture earlier than had the Ashkenazim, and so imbued were they with the Spanish and Portuguese civilization that they carried it with them wherever they went after the expulsions of 1492 and 1496. To this day, whether in Europe, Asia, North Africa, or America, Sephardim are apt to congregate among themselves, having their own synagogues and their own ecclesiastical authorities. They are readily distinguished from the Ashkenazim by their names and in the synagogue by their more Oriental pronunciation of the Hebrew and certain peculiarities in their ritual. They are, however, few in number and by intermarriage with Ashkenazim are gradually losing their identity. Judaism was never a favorable ground for the growth of sects. The enmity of the outside world produced a solidarity which triumphed over all attempts at division. The only sect that may be said to exist to-day is that of the Karaites, who probably do not number more than 15 or 20 thousand and are to be found in southern Russia, in various parts of the Turkish Empire, and in Egypt. The Samaritans, of whom about 200 souls still live in Nablus, the ancient Shechem, can hardly be counted as among the Jews, since they live a life entirely apart from the rest of the community and seek to preserve their ancient schismatic condition. Among the Ashkenazic Jews there are in reality only two divisions, the orthodox and the reform, and even here these divisions are by no means clearly cut. There being no Jewish church as such, and each community, and even each congregation, being a law unto itself, the greatest variety is found, starting with the ultraorthodox and reaching down to the most radical reform. For purposes of distinction we may speak of the three following divisions: orthodox, conservative, and reform Jews. The orthodox Jew believes in the absolute authority, not only of the Bible as the Word of God, but also of the traditional body of laws, statutes, and observances which have grown up around the written Law in course of time and which form the oral Law. After passing through various codifications, from the time of the two Talmuds (fourth to sixth century), this Law was put into some sort of final shape by Joseph Caro (sixteenth century). His *Shulhan Aruk* is considered the norm by which the orthodox Jew regulates both his religious and his everyday life. He believes that a strict performance of all its minor regulations is obligatory upon him on all occasions and at all times. The conservative Jew holds in practice also to the validity of both the oral and the written Law, but is a little less rigid in his observances and believes that some concession ought to be made to the spirit of the times and the conditions of modern life. Reform Judaism takes quite a different attitude respecting both the written and the oral Law. It professes to see a regular development in both and believes that Jewish belief and Jewish practice are supple enough to adapt themselves to all changes of environment and to all phases of human thought. Commencing with Moses Mendelssohn, towards the end of the eighteenth century, this reform has made greatest progress in Germany and the United States. Starting as an attempt to modernize the public worship of the synagogue, it has gradually so developed as to become a sort of Unitarianism modified by peculiar Jewish observances. It has more or less radical ideas in regard to the inspiration of the Bible; it has largely introduced the vernacular into the synagogue service, from which it seeks to remove all traces of its Oriental origin; and discards the separation of the sexes, the covering of the head, and the observance of the second-day festivals. In some places Sunday services have been introduced, in addition to those on the historical Sabbath (in Berlin as early as 1840, in the United States during the last quarter of the nineteenth century). In only one place (Chicago) has the Saturday service been entirely discarded in favor of the Sunday. Between these divisions, however, there are many subdivisions, and the words "orthodox" and "reform," as regards the Jews, are loosely and variously applied.

It is impossible to give a single description of the Jewish rites and ceremonies of to-day, because of the diversity which exists. Nominally, the seventh day is the day of the Jewish Sabbath; the demands made by modern commercial life render an observance of the day extremely difficult, and, except a small number of the orthodox, most Jews to-day keep their places of business open on the Sabbath. The festival of the New Year and the Fast of the Day of Atonement, both of which occur in the months of September and October, are perhaps the two festivals which are most rigidly observed. The Passover festival, which falls usually in the month of March or April, is still observed by most Jews, who abstain for a week from eating leaven. The celebration of the Pentecost festival (end of May or beginning of June), which commemorates the giving of the Law on Mount Sinai, has been made more solemn by the reform Jews, among whom it is the day of confirmation. Formerly (and this is the rule to-day in orthodox Jewish congregations) boys were confirmed at the age of 13, in whatever month they reached that period of life. Reform Judaism has substituted for this the annual day of confirmation, in which the girls participate together with the boys. The Feast of Tabernacles (celebrated in the autumn), which commemorates the dwelling of the Israelites in booths during the passage through the wilderness, is still universally observed in some manner or other. The minor festivals, such as the Ninth of Ab, the day upon which the temple in Jerusalem was destroyed; Purim, the commemoration of the deeds of Esther and Mordecai; as well as other minor festivals, are to-day observed only by the orthodox; though there is a tendency, even among reform Jews, to lay more than ordinary weight upon the celebration of the *Chanukkah*, which recalls the national regeneration under the Maccabæan heroes. The dietary laws, as laid down in the Bible and interpreted by the rabbinical authorities, are universally held to be binding among the orthodox Jews, while only a few of the reform Jews observe them through ancient habit or through veneration of the past.

The use of the Hebrew language among the Jews has generally given way to the vernacular of the countries in which they live. Of late, however, there has been a certain revival in the use of Hebrew, due to the more national Jewish sentiments which have inspired large numbers of the Jews. In the Jewish colonies in Palestine, Hebrew is the vernacular, and a number of Jewish journals and reviews are published in Hebrew, not only in the East, but in various parts of Europe. The Judæo-German, or Yiddish, has also experienced a revival. This language, which has as its base a dialect of German spoken in the Rhine regions during the Middle Ages, has become, through the expansion of the German Jews eastward, the common tongue of several millions of Jews living in Russia, Austria, and the Balkan Peninsula. When these Jews were again driven westward, during the closing quarter of the nineteenth century, they carried this Yiddish with them into the new ghettos of western Europe and northern America. In the large cities of these countries many Yiddish daily and weekly papers are published. Because of contact with many other languages and civilizations, this Yiddish has become variously modified by the introduction of Russian, Polish, High German, and English terms and forms.

The training of men for the Jewish ministry was in former times peculiarly one-sided. The seminaries, or *yeshibas*, devoted their time exclusively to rabbinical jurisprudence and Talmudic law; secular learning was looked at askance, as the rabbi was not a minister in the modern sense of the word, but a legal adviser and a judge in matters of religious dispute. Very early in the nineteenth century the need for some more modern course of instruction was felt. A seminary for the training of teachers was founded as early as 1809 in Cassel, Germany. The first regular seminary for the training of rabbis, however, was founded in Padua in 1829. In 1854 the conservative seminary was established in Breslau; this was followed by similar institutions in Berlin, London, Paris, Budapest, and Vienna. In the United States, after some abortive attempts in the sixties and seventies of the nineteenth century, the Hebrew Union College was founded in 1875 at Cincinnati, by the Union of American Hebrew Congregations, under the presidency of Isaac M. Wise. Dr. K. Kohler was elected its president in 1903. This Union, founded in 1873, comprised all the important congregations of the United States which had a leaning towards reform. It consisted in 1914 of 189 congregations. The college is generally recognized as the training place of ministers for this wing of the synagogue. It attempts to give its students an historical knowledge of the development of Jewish history and the Jewish religion and to fit them for active preachers and communal workers. As its graduates cannot serve in orthodox congregations, the Jewish Theological Seminary was established in 1886 in the city of New York for the purpose of training rabbis who shall understand the principles of Jewish law and be able to interpret it practically to the congregations whom they are to serve. In the year 1902 the Jewish Theological Seminary of America was enlarged, and Prof. S. Schechter, of Cambridge, England, was called to be the president of its faculty. In the year 1893 a training school for religious school-teachers was founded at Philadelphia, with the money left to the Mikwe Israel Congregation, of that city, by Hyman Gratz. It is called Gratz College. In 1908 the Dropsie College for Hebrew and Cognate Learning was opened in Philadelphia, as a postgraduate institution leading to the degree of doctor of philosophy. Dr. Cyrus Adler, of Washington, D. C., was called as president of this college. In 1893 the Jewish Chautauqua Society (q.v.) was founded by Dr. Henry Berkowitz, of Philadelphia, which carries on a sort of Jewish university extension work, by means of Chautauquan circles in various States and a summer meeting at Atlantic City. This gave rise in 1899 to the Jewish Study Society in London. Work on these lines is also done by the Young Men's Hebrew Associations, the first of which was founded in New York in 1874, and which are now to be found in nearly all the larger cities in the United States. A Jewish publication society was founded in Philadelphia in 1845, and a second one in New York in 1873, but both of these were short-lived. In 1888 the Jewish Publication Society of America was organized in Philadelphia and has since then published a number of works dealing with Jewish history and Jewish life. The only Jewish learned society in the United States is the American Jewish Historical Society, founded in 1892. In 1893 the Jewish Historical Society of England was founded. A similar society (Société des Etudes Juives) exists in France, and its interests cover the whole of Jewish history; while in Germany there are over 100 Jewish literary societies which give courses of lectures on Jewish subjects and publish a yearbook. The National Council of Jewish Women, an American organization established in 1893, has endeavored to foster the religious spirit in the home by the personal influence of its members and by organized philanthropic effort. The Intercollegiate Menorah Association was organized in 1913. Its purpose is the study and advancement of Jewish culture and ideals among college men. It has at present over 20 societies.

One of the peculiar features of American Judaism is the large development of the Sabbath schools attached to the congregations. As early as 1838 a general Sabbath school was organized in Philadelphia for Jews of all shades of belief. In 1845 the movement spread to New York, in 1848 the Hebrew Educational Society was founded in Philadelphia, and in 1864 the Hebrew Free School Association was incorporated in New York.

The arrival of large numbers of Jews from Russia and Rumania has made necessary the founding of manual training and technical schools, in which the rising generation may be taught handicrafts, from which they have largely been excluded by legislation in eastern Europe. Such schools exist in New York, Philadelphia, Chicago, and other cities and have been fostered especially by the Baron de Hirsch Fund.

A remarkable development in modern Jewish life is that of the Zionist movement. In a measure it is the continuation of the old Jewish hope of restoration to the land of Palestine. It is also the Jewish answer to anti-Semitism. Starting with a pamphlet by Dr. Theodor Herzl of Vienna (*A Jewish State: An Attempt at a Modern Solution of the Jewish Question*, Vienna, 1896; Eng. trans. by D'Avigdor, London, 1896), it soon took hold of the Jewish people, and Zionist societies and clubs are now to be found wherever Jews exist. The object of the Zionist movement is to found a secure and legal home for the oppressed Jews in Palestine. The Federation of American Zionists was organized in 1897 and has held 17 annual conventions. It has 14,000 shekel payers and 102 societies. The Jewish Colonial Trust has been organized by the International Congress and has its head offices in London. See ZIONIST MOVEMENT.

There being no international Jewish organization, except that of the Zionist congresses, the Jews in each country have been forced to band themselves together in various ways in order to subserve interests, social and economic, which they have in common. In France the Alliance Israélite Universelle (q.v.), founded in Paris in 1860, has not only looked after the interests of Jews in Mohammedan countries supposed to be in the sphere of French influence, but has also on several occasions used its good offices to procure the amelioration of the condition of the Jews wherever its influence could be brought to bear. In England the Board of Jewish Delegates has attempted to do the same thing. Austria has its Israelitish Alliance, and Germany its Union of Congregations (Deutsch-israelitische Gemeinde-Bund). In the United States no such single union has been possible. The Union of the American Hebrew Congregations comprises those bodies which belong to the reform wing of the synagogue, and a union of orthodox Hebrew congregations was founded in New York in 1886. About the middle of the nineteenth century, when Jews were scattered in out-of-the-way places, a number of orders similar to that of the Freemasons were called into being. The B'nai B'rith (Sons of the Covenant), founded in the United States in 1843, in 1913 had 412 lodges and 38,447 members in America and a few in Germany, Rumania, Austria, Algeria, Bulgaria, and Egypt. Other similar societies are the Sons of Benjamin, the Free Sons of Israel, and the Free Sons of Judah. As the number of Jews in the United States increased, extensive calls were made upon the Jews already domiciled there to provide adequately for their more unfortunate brethren. Many homes for orphans have been established, also homes for the aged, and hospitals. A Jewish Agricultural and Industrial Aid Society was organized in 1900, which assists Jewish immigrants to become farmers by helping them to find suitable farms, loaning them money on favorable terms, and maintaining a Farm Labor Bureau. A Jewish Agricultural Experiment Station was organized in 1910. The National Jewish Fraternal Congress, organized in 1911, has 600,000 members in constituent orders. A National Jewish Immigration Council was organized in 1911, and in the same year a National Union of Jewish Sheltering Societies. In 1889 Rabbi Gustav Gottheil organized the first Sisterhood for Personal Service, in connection with the Temple Emanu-El in New York City. Since then such societies, in which the work is done by the women of the congregation, have become attached to nearly every important synagogue in the land. The National Federation of Temple Sisterhoods was organized in 1913 and now consists of 71 societies. In most of the cities the work of the Jewish charities has been organized, so that one central body directs it in a large measure—the United Hebrew Charities of the City of New York. On Dec. 1, 1899, a national conference of Jewish charities in the United States was held at Cincinnati, with the end in view of bringing about a greater coöperation among the relief societies situated in the various parts of the country. Of more recent date is the attempt by the Jews to do settlement work in the congested districts of the large cities where the poorer Jews live—a work until now undertaken almost exclusively by Christian organizations. The Educational Institute, in New York, is a sort of people's palace, and a regular Jewish settlement exists in Chicago. No account of Jewish charitable endeavor during the nineteenth century would be complete without the particular mention of Baron and Baroness de Hirsch, who bequeathed 300,000,000 francs for the purpose of aiding the oppressed Jews of eastern Europe. This fund is in the hands of a private corporation composed of a few trustees and has its seat in Paris. It has spent vast sums in colonizing some 5000 Jews in the Argentine Republic; it assists colonization in Canada and has recently taken over the Jewish colonies established by Edmund de Rothschild in Palestine; it also maintains schools and homes in several American cities to which the Russian Jews have emigrated. See HIRSCH, MAURICE, BARON DE.

JEWS IN THE WORLD

Europe	....	9,105,608
Austria-Hungary	1910	*2,258,262
Belgium	1910	15,000
Bulgaria	1910	37,656
France	1911	100,000
Germany	1910	615,021
Italy	1901	35,617
Netherlands	1910	106,309
Rumania	1900	269,015
Russia	1897	†5,215,805
Switzerland	1910	19,023
Turkey	1904	‡188,900
United Kingdom	1911	§245,000
Australasia	....	20,000
Asia	....	344,115
India	1911	20,980
Afghanistan	....	18,135
Asiatic Turkey	....	‖177,500
Palestine	....	‖78,000
Persia	1904	49,500
Africa	....	393,209
Abyssinia	....	6,500
Algeria	1906	¶64,645
Egypt	1907	38,635
Morocco	1904	¶110,000
South Africa	....	46,769
Tripoli	1901	**18,660
Tunis	1904	¶108,000
America	....	2,183,414
Argentina	1911	55,000
Canada	1911	75,680
Mexico	1911	8,972
United States	1910	2,043,762

* Hungary, 1,313,687. † Poland, 1,321,100. ‡ Turkish Empire, 344,400. § British Empire, 455,135. ‖ To Turkish Empire. ¶ To France. ** To Italy.

Statistics. According to the latest issue of the American Jewish Year Book (1913), "the total number of Jews in the world may be estimated at 12,000,000," of whom, in round numbers, 9,125,000 are assigned to Europe, 2,043,000 to North America, 62,000 to South America, 355,000 to Asia, 395,000 to Africa, and 20,000 to Australasia. This estimate is very conservative. The figures actually given amount to about 90,000 more; the latest of them come from the year 1911; the largest figure, that for Russia, is based on the census of 1897. In spite of emigration, persecution, and unfavorable conditions, it may be questioned whether the Jewish population in Russia has remained stationary since 1897; but there are no reliable data for the increase, if there has been a growth.

In view of the increase through immigration and excess of births over deaths, it may be regarded as certain that there were on Jan. 1, 1915, more than 2,500,000 Jews in the United States and more than 1,000,000 in New York City. More than 10 per cent of the population of New York State is Jews; it has been estimated that the Jewish population exceeds 100,000 also in Pennsylvania, Illinois, Massachusetts, Ohio, New Jersey, Missouri, and California, and there is no State or Territory in the United States in which there are not some Jews.

Language. By the Hebrew language is usually meant the language in which all the books of the Old Testament are written except parts of Daniel (q.v.) and Ezra (q.v.). The expression "Hebrew language" is not found in the Old Testament. In its place we have "speech of Canaan" (Isa. xix. 18) and "Jews' language" (2 Kings xviii. 26, 28; Neh. xiii. 24), corresponding to the general use of the term "Jew," i.e., Judæan, for the entire nation in the later books. This "language of Canaan" belongs to the northern branch of the Semitic family of languages. It is practically identical with the Phœnician, with the speech of the Syrian correspondents of Amenhotep III and IV, as occasional lapses into the vernacular in the Amarna letters (q.v.) show, and with the Moabitish, as the Mesha inscription shows. Some traces of dialects appear in the Old Testament (cf. Judg. xii. 5, 6), and it is not improbable that there were characteristic differences of pronunciation and expression between Judah and Israel, Galilean and Ephraimitish, East and West Jordan tribes, just as at a later time there were dialectical differences between Judæan, Samaritan, and Galilean Aramaic. In writing Hebrew the alphabet employed was the old North Semitic (see ALPHABET; BIBLE, *Text of the Old Testament*), and this was still used for official purposes (e.g., on coins) as late as in the time of Simon Bar Cochba (132–135 A.D.). In writing the Aramaic vernacular, however, a more cursive hand was introduced, with a tendency towards more square characters. This was particularly the case when the writing material was papyrus, and may be seen in one of the Elephantine Papyri (q.v.) from the year 484 B.C. In Palestine the Jews employed, when writing their Aramaic dialects, the modification of the North Semitic alphabet used in Syria by Palmyrenes, Nabatæans, and other Aramaic-speaking peoples. It was called the "Assyrian" script (Assyrian being used in the sense of Syrian) or the "square" writing. The earliest examples in Palestine are found in two inscriptions at Arak al-Amir, probably written by Hyrcanus, grandson of Tobias, between 183 and 175 B.C. This square Aramaic script was adopted by the Jewish scribes in copying the Holy Scriptures, probably in the first century B.C., since Yodh could be familiarly referred to in the following century as the smallest letter (Matt. v. 18), while the Samaritans continued to copy the Law in the Hebrew, i.e., the old North Semitic characters. (Cf. Driver, *Notes on the Hebrew Text and the Topography of the Books of Samuel, with an Introduction on Hebrew Palæography and the Ancient Versions*, 2d ed., Oxford, 1913.) For the grammatical structure and general characteristics of the Hebrew language, see SEMITIC LANGUAGES. On other languages spoken by the Jews, see ARAMAIC; LADINO; YIDDISH.

A grammatical treatment of the Hebrew first commenced after the language ceased to be spoken by the people. The vocalization and accentuation of the text originated in the sixth and seventh centuries after the time of Christ. (See MASORA.) The Jews made the first attempt at a system of grammar about the dawn of the tenth century, after the example of the Arabians, and originally even in the Arabic language. Rabbis Saadia Gaon (Saadia ben Joseph, died 942), Jehuda Hayyug (c.1030), Jonah (Ibn Janach, c.1030), Abraham ben Ezra (died 1167), and David Kimchi (died 1235) were the first grammarians. The dictionary of the last was long considered the best. The founder of the study of Hebrew among Christians was Johann Reuchlin (died 1522), who, however, like the grammarians of the next age, Buxtorf and others, strictly adhered to Jewish tradition and method. A new era began when the study of other members of the Semitic family of languages, Syriac, Arabic, and Ethiopic, enlarged the field of view. Albert Schultens (died 1750) and Nikolaus Wilhelm Schröder (died 1798) are noteworthy in this work. The development of Assyriological research during the nineteenth century has added much to our knowledge of the relation of Hebrew to the other Semitic dialects. Wilhelm Gesenius (died 1842) was by far the greatest of Hebraists up to his time. His *Hebräische Grammatik* (Halle, 1813; 27th ed. by Kautzsch, Leipzig, 1902; several Eng. trans., including one by the Americans Mitchell and Price, 2d ed., from the 25th German ed., Boston, 1894), *Thesaurus Linguæ Hebraicæ* (Leipzig, 1829–42), completed by Rödiger, and shorter *Hebräisches und chaldäisches Handwörterbuch* (2 vols., Leipzig, 1810–12; 14th ed. by Buhl, 1905; Eng. trans. by Tregelles, Robinson, and others) were not only better than any previously produced, but are still those in most general use. Since Gesenius noteworthy grammars have been written in German by Ewald (Leipzig, 1827), Olshausen (Brunswick, 1861), Stade (Leipzig, 1879), and König (ib., 1881–97), and dictionaries by Fürst (ib., 1837–40) and by Siegfried and Stade (ib., 1873). The grammatical and lexicographical researches of Lagarde (died 1891) and Barth deserve special mention. The Hebrew-English dictionary by Brown, Driver, and Briggs (Boston, 1906) gives the results of the latest scholarship and research.

Literature. Only a scanty portion of ancient Jewish literature has come down to the present day. The Tell el-Amarna tablets show that writing on clay was known in Palestine as early as 1400 B.C. Whether the "journals of his fathers" which Zakar Baal, of Byblos, ordered to be read to Wen Amon in the reign of Ramses XII (c.1118 B.C.), according to the Golénischeff Papyrus, were written in cuneiform characters is not certain, but probable. Yet it is not altogether impossible, if they came from Zakar Baal's father and grandfather, that they were written in the North Semitic alphabet, since this method of writing may have been invented before the first half of the twelfth century. (See ALPHABET.) There is no reason to doubt that the Habiri, or Hebrews, referred to in the Tell el-Amarna tablets, knew how to use the cuneiform script, but they probably adopted the Semitic alphabet soon after its invention. Some of the songs and stories of earlier ages may never have been written down at all before they were recorded in the new alphabetic script a century or more before David, and some that had been known through cuneiform inscriptions may at that time have been written down in the alphabetic script. The bulk of the remains of ancient Jewish literature is to be found in the Old Testament, and since the latest portions of the Old Testament bring us down to the Hasmonæan age, it embraces a period of more than 1000 years. To the Old Testament, however, as preserved in the Jewish canon of scriptures, must be added as properly belonging to ancient Jewish literature, not only the deuterocanonical books (q.v.), but also a large number of apocryphal books, originally written in Hebrew or Aramaic. (See APOCRYPHA.) With reference to form and contents this literature may be divided into poetry (lyric, didactic, and religious), history (including legends, traditions, and myths in historical garb), legal codes, religious discourses, romances, apocalyptic works, and philosophical disquisitions. The oldest specimens are probably found in the lyric poems, e.g., the Song of the Crossing of Arnon (Num. xxi. 14 f.), the Song of the Capture of Be'er (Num. xxi. 17 f.), the Song of the Conquests of Sihon (Num. xxi. 27–30), the Song of Deborah (Judg. v), and the Fable of Jotham (Judg. ix. 7 ff.). The earliest collections of traditions, historical reminiscences, stories, songs, legends, and laws (like the Covenant Code, Ex. xxi. 23–xxiii) may have been made towards the end of the period of the Judges. Among the remnants that seem to indicate a wealth of lyric poetry in the age of David and Solomon are David's Elegy on Saul and Jonathan (2 Sam. i. 17 ff.), the Blessing of Jacob (Gen. xlix), the Prophecies of Balaam (Num. xxii–xxiv), and the Blessing of Moses (Deut. xxiii). A number of oracles, in poetic form, uttered by prophets in the eighth, seventh, and sixth centuries B.C. have come down to us, though in collections of a much more recent date. It is possible that the period of the exile saw the addition of Deuteronomy (q.v.) to the Story of Origins and the Story of Moses and the Legislation, by which the earliest form of the Pentateuch as a whole seems to have been constituted, though it was afterward greatly expanded. Characteristic of the Chaldæan and Persian periods was the attention bestowed on the Law and the prophetic collections. Much new material, legislative, narrative, and prophetic, seems to have been added to earlier works and collections. Still later apparently, and belonging chiefly to the Græco-Macedonian period, are philosophical productions, as Job, Proverbs, Ecclesiasticus, Ecclesiastes; the great body of the religious poetry (the Psalter), though some of the psalms in a theologically less developed form may have originated in the preëxilic epoch; and the romances, such as Ruth, Esther, Judith, and Tobit. For details, see the articles on the separate books of the Hebrew canon; also BIBLE; DEUTEROCANONICAL BOOKS; APOCRYPHA; PENTATEUCH; PROPHECY; APOCALYPTIC LITERATURE.

Though the uncertainty concerning the dates of the numerous works that make up Jewish biblical literature renders it difficult to divide its contents into definite periods, it is generally admitted that periods may be fixed, having certain literary characteristics, even if there is no agreement among scholars as to the number of productions that properly belong to this or that period. There is a *first* period, ending with the disruption of the Kingdom in c.953 B.C., to which, as is generally recognized, some of the finest of Hebrew lyrics belong, and, in the judgment of many scholars, a not inconsiderable portion of story and legislation as well. The characteristic of the *second* period (c.953–586 B.C.) is unquestionably the appearance of the oracles of the great preëxilic prophets and the records of the reigns of the Israelitish and Judæan kings, whatever other literary products may likewise be regarded as belonging to it. That a gathering together of old material into larger collections is one of the chief marks of the *third* period (586–332 B.C.) will be widely acknowledged, even if the extent of editorial freedom and activity in bringing out larger volumes of history, legislation, and poetry may be differently defined.

A *fourth* period (332–165 B.C.) is characterized by one work that can be dated with certainty, Ecclesiasticus i–xliii, as the grandfather of the translator, who came to Egypt in 132 B.C., must have written about 180 B.C. A comparison of this work with other specimens of the wisdom literature has convinced many scholars that such products of the same spirit and intellectual milieu as Job, Proverbs, and possibly Ecclesiastes, belong to the same period. To this age belongs also essentially that great achievement of the Jews of Egypt, the translation of the Hebrew scriptures into Greek, though we know from the prefaces to Esther and Ecclesiasticus that this activity continued into the following period.

The *fifth* period (165 B.C.–135 A.D.) is characterized by several tendencies. One was legalistic, having to do with the interpretation of the Law. The *Midrash* (q.v.), or the inquiry into the meaning of the sacred text, was divided into *Halacha*, which considered the exegesis and completion of the written code through the oral Law, with a view to practical results, and *Haggada*, which sought the essence of the religious and historical interpretations. At first both were the oral deliverances of the Sopherim, or scribes, but gradually written memorials made their appearance. The public interpretation of the scriptures in schools and synagogues, the independence of the Sanhedrin, the strife of sects, and the influences of Alexandrian culture furthered this development. We possess in the Pirke Aboth and other tractates of the Mishna, and also in the texts of the Covenanters of Damascus, written c.100 B.C., evidences of this activity; but the written targums, or Aramaic versions of the Bible, belong to a later period. (See TARGUM.) Another tendency was apocalyptic. While none of the great apocalyptic works is dated, the false ascription to some ancient seer making this impossible, internal evidence often points with apparent conclusiveness to the time of composition, and it may be regarded as certain that a number of apocalypses ascribed to Daniel, Enoch, Moses, Baruch, and Ezra come from this period. Less conclusive is the evidence that the period saw a great development of psalmody. But there can be little doubt that the Psalter of Solomon (q.v.) was written in the middle of the first century B.C., and many scholars maintain that the bulk of the Psalms in the Hebrew canon were written in the Maccabæan and Hasmonæan periods. The development of Hellenistic literature in Egypt, culminating in Philo, not only affected Palestinians like Josephus and showed itself in many of the deuterocanonical and apocryphal works, but also influenced Saul of Tarsus, the author of the Fourth Gospel, and other Christian writers who, nurtured in the principles of Judaism, retained many traces of their ancestral culture, feeling, and faith. The reaction against Hellenism, which saved the synagogue from being absorbed by the church, was led by such doctors of the oral Law as Hillel, Shammai, Johanan ben-Zakkai, the Gamaliels, Eleazar ben-Hyrcanus, Joshua ben-Hananya, Ishmael, Akiba, and others, to whom the honorary title of rabbi (master) or talmid hakam (disciple of the wise) was given. Besides the Hasmonæan and Bar Cochba coins, Greek and Latin inscriptions of this period are extant.

The *sixth* period reaches from 135 to 475. Instruction in the Halacha and Haggada now became the principal employment of the flourishing schools in Galilee, Syria, Rome, and, after 219, in Babylonia; the most distinguished men were the masters of the Mishna (q.v.) and the Talmud (q.v.)—viz., Eleazar ben-Jacob, Jehuda, Jose, Meir, Simeon ben-Yohai, Jehuda the Holy, Nathan, Hiyya, Rab, Samuel, Johanan, Hunna, Rabba, Rava, Papa, Ashe, and Abina. Besides expositions, ethical treatises, stories, fables, and history were also composed; the liturgy began to assume larger dimensions, the targum to the Pentateuch and the Prophets was completed, and the calendar fixed by Hillel the Second, 340. After the suppression of the academies in Palestine, those of Mesopotamia—viz., at Sura, Pumbeditha, and Nehardea—became the centres of Jewish literary activity. On Sabbaths and festal days the people heard, in the schools and places for prayer, instructive and edifying discourses. Of the biblical literature of the Greek Jews we have only fragments, such as those of the versions of Aquila (q.v.) and Symmachus (q.v.).

The *seventh* period was from 475 to 740. By this time the Jews had adopted the language of the country they happened to dwell in. During the sixth century the Babylonian Talmud was concluded, the Palestinian Talmud having been edited about 100 years before. Little remains of the labors of Jewish physicians of the seventh century or of the first *geonim*, or presidents, of the Babylonian schools, who first appear in 589. On the other hand, from the sixth to the eighth century, the Masora was developed in Palestine (at Tiberias), and besides a collection of the earlier haggadas (e.g., *Bereshith rabba*), independent commentaries were likewise executed, as the *Pesikta*, the *Pirke of Eliezer* (700), etc. See Midrash; Haggada.

In the *eighth* period (from 740 to 1040) the Arabs, energetic, brilliant, and victorious in literature as in war, had appropriated to themselves the learning of Hindus, Persians, and Greeks, and thus stimulated the Oriental Jews, among whom now sprang up physicians, astronomers, grammarians, commentators, and chroniclers. Religious and historical haggadas, books of morality, and expositions of the Talmud were likewise composed. The oldest Talmudic compends belong to the age of Anan (c.750), the earliest writer of the Karaite Jews. The oldest prayer book was drawn up about 880, and the first Talmudic dictionary about 900. The most illustrious *geonim* of a later time were Saadia (died 942), equally famous as a commentator and translator of Scripture into Arabic, a doctor of law, a grammarian, philosopher, and poet; Sherira (died 998), and his son Hai (died 1038), who was the author, among other works, of a dictionary. From Palestine came the completion of the Masora and of the vowel system; numerous *midrashim*, the hagiographical targums, and the first writings on theological cosmogony were also executed there. From the ninth to the eleventh century Kairawan and Fez in Africa produced several celebrated Jewish doctors and authors. Learned rabbis are likewise found in Italy after the eighth century, e.g., Julius in Pavia, etc. Bari and Otranto were at this time the great seats of Jewish learning in Italy. After the suppression of the Babylonian academies (1040) Spain and Egypt became chief seats of Jewish literature. To this period belong the oldest Hebrew codices, which go back to the ninth century. Hebrew rhyme is a product of the eighth, and modern Hebrew prosody of the tenth century.

The *ninth* period (from 1040 to 1204) is the most splendid era of Jewish mediæval literature. The Spanish Jews busied themselves about theology, exegetics, grammar, poetry, the science of law, astronomy, mathematics, philosophy, rhetoric, and medicine. They wrote sermons and ethical and historical works. The languages employed were Arabic, rabbinical Hebrew, and ancient or classical Hebrew. We can only mention here the great doctor, Samuel Halevi (died 1055), and the renowned Maimonides, whose death closes this epoch. The literature of the French rabbis was more national in its character and kept more strictly within the limits of the Halacha and Haggada. In Languedoc, which combined the literary characteristics of France and Spain, there were celebrated Jewish academies at Lunel, Narbonne, and Nîmes, and we find Talmudists, such as Berchia Halevi, Abraham ben-David, etc. The fame of the Talmudists of Germany, especially those of Mainz and Regensburg, was very great. Among the most illustrious Jewish writers of this period belonging to that country are Simeon, the compiler of the Midrashic collection known as the *Yalkut*, Joseph Kara, and Petahya. Only a few names belong to Greece and Asia; still the Karaite Jews had a very able writer in Juda Hadassi (1148).

The *tenth* period (from 1204 to 1492) bears manifest traces of the influence exercised by Maimonides. Literary activity showed itself partly in the sphere of theologicoexegetic philosophy, partly in the elaboration of the national law. With the growth of a religious mysticism there also sprang up a war of opinions between Talmudists, philosophers, and cabalists. The most celebrated Jews of this period lived in Spain, later in Portugal, Provence, and Italy. To Spain belong (in the thirteenth century) the poet Jehuda al-Hanzi, etc. In the fifteenth century a decline is noticeable. Books written in Hebrew were printed at Ixar in Aragon (1485), at Zamora (1487), and at Lisbon (1489). During this epoch the chief ornaments of Jewish literature in Languedoc were Moses ben-Abraham, David Kimchi, Jeruham, Farissol, Isaac Nathan, the author of the Hebrew Concordance. In Italy, Jewish scholars employed themselves with the translation of Arabic and Latin works. Works of an æsthetic character were written by Immanuel ben-Solomon, the author of the first Hebrew sonnets, and by Moses de Rieti (born 1389), who wrote a Hebrew imitation of the *Divina Commedia*. It was here that the first Hebrew books were printed, at Reggio, 1475; Pieve di Sacco, 1475; Mantua, 1476; Ferrara, 1477. In France mention may be made of the collectors of the Tosaphot, Moses de Coucy and Jehiel ben-Joseph. Germany produced a multitude of writers on the Law, such as Eleazar Halevi, Meyer of Rothenburg, Asher, Isserlin, Lippmann. Most of the extant Hebrew manuscripts belong to this period, but a great part of mediæval Jewish literature lies still unprinted in the libraries of Europe.

The *eleventh* period (1492 to 1755) is marked by erudition in many fields and some noteworthy advances by radical thinkers. In Italy and the East (1492), in Germany and Poland (1550), as well as in Holland (1620), Jewish scholars worked printing presses, while numerous authors wrote in Hebrew, Latin, Spanish, Portuguese, Italian, and Judæo-German. Some of the most eminent theologians, philosophers, jurists, historians, mathematicians, poets, commentators, lexicographers and grammarians of this period among the orthodox Jews were Isaac Abrabanel, Elia Miahrahi, I. Arama, J. Habib, Elias Levita, Obadiah Sforno, Joseph Cohen, Gedalia ibn-Yahya, Sal. Usque, Asaria de Rossi, David de Pomis, David Gans, Isaac Troki, I. Luria, J. Caro, M. Alshech, M. Jafé, J. Heller, I. Aboab, Manasseh ben-Israel, David Conforte, Leo de Modena, B. Musaphia, J. Eybeschütz, D. Oppenheimer, J. Emden, and M. C. Luzzatto. A bold thinker, who met with a sad fate because of his opposition to accepted beliefs, was Uriel da Costa, and the greatest philosopher the Jewish people has produced was Baruch Spinoza, whose influence for a long time was felt more strongly in the Christian world than in Jewry.

The *twelfth* period extends from 1755 to the present time. Encouraged by the spirit of the eighteenth century, Moses Mendelssohn opened to his coreligionists a new era which, as in the Middle Ages, first manifested itself in the national literature. Its character, contents, expression, and even its phraseology, were changed. Poetry, language, philology, criticism, education, history, and literature have been earnestly cultivated. Among the illustrious names of the early part of this period may be mentioned Ezekiel Landau, Elias Wilna, J. Berlin, Mendelssohn, Maimon, Bendavid, Beer, Euchel, Benzebh, S. Dubno; but the real foundation for the work of the modern critical school was laid by L. Zunz, whose *Gottesdienstliche Vorträge der Juden* (Berlin, 1832; 2d ed., Frankfort, 1892) brought light for the first time into the history of the Midrashic literature, and whose works on the religious poetry of the Jews have served as a basis for all later scholars. He was ably seconded by S. L. Rapoport, N. Krochmal, M. Jost, S. D. Luzzatto, and M. Steinschneider. Among those who have continued the work done by Zunz may be mentioned A. Geiger, L. Dukes, M. Sachs, S. Munk, Reggio, Z. Frankel, L. Löw, H. Graetz, D. Rosin, M. Joel, A. Jellinek, W. Bacher, J. Derenbourg, S. Buber, M. Kayserling, M. Güdemann, D. Kaufmann, A. Neubauer, A. Berliner, D. Chowlson, A. Harkavy, S. Schechter, Isidor Loeb, Marcus Jastrow, Morris Jastrow, Gustav Gottheil, J. R. Gottheil, Kaufmann Kohler, Emil Hirsch, and C. G. Montefiore.

A great influence has also been exerted by the journals and periodicals which in part are devoted to purely literary questions and in part treat of religious and practical affairs. One of the first of these was the *Measef* (Collector) published by the circle which gathered around Mendelssohn. L. Philippson in Bonn, A. Geiger in Berlin, Szanto in Vienna, Lehmann in Mainz, Fürst in Leipzig, and I. M. Wise in Cincinnati were among the pioneers in modern Jewish journalism. They have been followed by a host of others. The leading periodicals are Z. Frankel's *Monatsschrift für die Geschichte der Juden* (Breslau, 1851 et seq.); *Monatsschrift für die Wissenschaft des Judenthums* (Berlin, 1883 et seq.); *Revue des Etudes Juives* (Paris, 1879 et seq.); *Jewish Quarterly Review* (London, 1888 et seq.), new series (Philadelphia, 1910 et seq.); *Jewish Review* (London, 1910 et seq.). Besides these periodicals mention should also be made of the powerful influence exerted by the *Jewish Encyclopædia* edited by Isidore Singer (New York, 1901–06).

There is no country in Europe which does not count Jews among the foremost representatives of its intellectual progress. In Germany some of the greatest professors at the universities and academies have been Jews. The list includes the names of Gans, Benary, Weil, Benfey, Bernays, Stahl, Derenbourg, Valentin, J. Kaufmann, Spitzer, Lazarus, Herz, Steinthal, and Barth. To these may be added Bréal, Oppert, H. Weil, Salomon Reinach, Th. Reinach, S. Munk, and H. Derenbourg in France, Sylvester in England, G. Brandes in Denmark, D. H. Müller in Austria, S. D. Luzzatto in Italy, and I. Goldziher in Hungary. Conspicuous in literature and the various fine arts are the names of Heinrich Heine, Ludwig Börne, Rahel Levin (Varnhagen), Berthold Auerbach, Marcus Herz, Jules Janin, Max Nordau, Israel Zangwill, Mark Antokolski, James Darmesteter, Catulle Mendès, Felix Mendelssohn-Bartholdy, Halévy, Waldteufel, Meyerbeer, Moscheles, Joachim, Rubinstein, Wieniawski, Grisi, Costa, Rachel, Dawison, Dessoir, Bernhardt.

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JEWS, Exchequer of the. In early English history the Jews did not form an integral part of the body politic, but constituted a special status, dependent directly upon the crown and subject to any restrictions and exactions the King might impose upon them. In 1194 proctors or judges were appointed to deal with cases in which Jews were concerned. In the thirteenth century these officials presided over the exchequer chamber set apart for Jewish revenue and accounts and were sometimes known as "justiciars deputed to the charge of the Jews," sometimes as "justiciars of the exchequer of the Jewry." In their judicial capacity these officials tried offenses in which non-Jews would have had to appear before the King's ordinary justices; they also decided civil suits between Jews, or between Jews on the one hand and Christians on the other. As fiscal officials, they presided over the exchequer chamber of the Jews and saw that all claims which the King had against Jews, or arising out of transactions in which Jews were involved, were presented and enforced. They provided the sheriff of each county with lists of the sums which he was expected to collect from the Jews; they kept records of royal claims on the Jews and their debtors and administered property that came into the King's hands on account of the Jews. In the first instance the Jewish revenue was paid into the great exchequer, whence it was transferred to the exchequer of the Jews, to be kept until the King needed it. The institution disappeared with the expulsion of the Jews under Edward I.

JEWS'BURY, Geraldine Endsor (1812–80). An English novelist. She was born at Measham, Derbyshire, and was the daughter of a Manchester merchant. She was left motherless at an early age and was educated by her sister Maria Jane (afterward Mrs. Fletcher), a popular author. An early acquaintance with Thomas Carlyle and his wife and other literary and artistic celebrities helped to develop her powers, and her first novel, *Zoe, the History of Two Lives* (1845), was the forerunner of a succession of works, which include: *The Half Sisters* (1848); *Marian Withers* (1851); *The History of an Adopted Child* (1852); *Angelo, or the Pine Forest in the Alps* (1855); *Constance Herbert* (1855); *The Sorrows of Gentility* (1856); *Right or Wrong* (1859).

JEWSBURY, Maria Jane (1800–33). An English author, born at Measham, Derbyshire, sister of the preceding. At the age of 18 she began to write poetry for the newspapers of Manchester, where she lived. Her first prose work, *Phantasmagoria, or Sketches of Life and Character*, was published in Leeds (1824). It was followed by *Letters to the Young* (1828); *Lays of Leisure Hours* (1829); *The Three Histories—of an Enthusiast, a Nonchalant, and a Realist* (1830). She married the Rev. William K. Fletcher (1832), chaplain to the East India Company, and died of cholera in a little more than a year after she had gone with him to India.

JEW'S-HARP (*Jew* + *harp*, in allusion to the use of the harp, as David's harp, among the Jews). A simple musical instrument, made of metal. It is held between the teeth, and the sound is produced by the inhaling and ejecting of the air from the lungs, while at the same time an elastic tongue or spring, which is fixed in the middle of the frame, is set into vibration by being twitched by the finger. It is an old invention, being mentioned by Prätorius in his *Organographia* (1619) under the name of crembalum.

JEW'S MALLOW. An annual potherb. See Corchorus.

JEWS'-THORN. A spiny Old World shrub which bears an edible fruit. See Jujube.

JEX-BLAKE, Sophia (1840–1912). An English physician, born at Brighton. She was a tutor in mathematics at Queen's College, London, in 1858–61. She then traveled in Europe and America, became interested in the medical education of women, and in 1866 began the study of medicine under Dr. Lucy Sewall in Boston. Returning to England in 1868, she matriculated in medicine at the University of Edinburgh in the following year, but was not permitted to finish the course, although she contested the action of the university authorities in the law courts. She was a leader in opening the London School of Medicine for Women in 1874. Her own medical education she completed at the University of Bonn, receiving the degree of M.D. in 1877. At Edinburgh she opened a Dispensary for Women and Children in 1878, the Cottage Hospital in 1885, and in 1886 the Edinburgh School of Medicine for Women, of which she was dean until her retirement in 1899. She is author of *American Schools and Colleges* (1866); *Medical Women* (1872; 2d ed., 1886); *Care of Infants* (1884; 2d ed., 1903).

JEYPORE, jī-pōr'. Another spelling for the name of a native State of India, and its capital. See Jaipur.

JEZ'EBEL (Heb. *'Izebel*). The daughter of Ethbaal, King of Tyre, and wife of Ahab, King of Israel. Ahab's marriage with a Tyrian princess (1 Kings xvi. 31) was a political device to insure the alliance with Tyre. As a symbol of the alliance, a temple to Baal Melkart, the god of Tyre, seems to have been built. The worship of this god was probably very similar to the Baal cult that already flourished in Israel and not very different from the Yahwe cult as it was then practiced. To a later age the act of Ahab in marrying a "Canaanitish" woman appeared as a heinous offense, and accordingly both Ahab and Jezebel are represented in Kings and Chronicles in the most unfavorable light. In Ahab's reign a strong movement led by Elijah (q.v.) against the Baal cult set in, and Jezebel is represented as having been one of the strongest and bitterest opponents of Elijah. Hence the later biblical writers cannot find enough to say against her. She is represented as cruel, intent upon exterminating the prophets of Yahwe, and is made responsible for the murder of Naboth (q.v.). These charges can scarcely be regarded as borne out by the evidence when a careful textual and historical criticism has been applied. She survived her husband for 14 years and was murdered (2 Kings ix. 30–37) by Jehu (q.v.) at the time that he seized the throne of the northern kingdom (c.843 B.C.). Consult the histories of Israel, and Schmidt, "The Sins of Jezebel," in *Journal of Biblical Literature* (Boston, 1915). See Ahab.

JEZI'RAH (Heb. *sēfer yeṣīrāh*), or Book of Creation. One of the chief cabalistic books of the Jews, containing a mystical account of the creation of the universe. See Cabbala.

JEZREEL, jĕz'rē-ĕl (Heb. *yizre'el*, God sows). A town of ancient Palestine in the territory of Issachar (Josh. xix. 18) (Map: Palestine, C 2). Near by was fought the battle in which Saul fell (1 Sam. xxix. 1 et seq.). The town contained a palace, which was the residence of Ahab and Jezebel (1 Kings xviii. 45–46; 2 Kings ix. 30). After their time it was deserted. In the time of Eusebius and Jerome it was known under the names Esdraela and Stradela, and in the history of the Crusades we meet with it as Parvum Gerinum. The modern Arabic name of the place is Zerin; it contains only slight ruins, of little interest.

JHANSI, jän'sē. The headquarters of a district of the same name, United Provinces, India, 60 miles northeast of the city of Gwalior (Map: India, D 4). It is surrounded by a wall from 18 to 30 feet high, 6 to 12 feet thick, and 4½ miles in circuit. The town is important as the central junction of four lines of the Indian Midland Railway system. It has manufactures of silk, rugs, and brassware. The large railway shops employ more than 2000 hands. It is the centre for agricultural products of the district. Pop., 1901, 55,724; 1911, 70,208. The formidable fort on an elevated rock, commanding the city and surrounding country, belongs to the British government.—Jhansi Naoabad, with the civil station and military cantonment (pop., 3000), adjoins the city and is the capital of the British District of Jhansi in the Allahabad division, Northwest Provinces. The European garrison was massacred during the mutiny of 1857, and Jhansi was only recovered the following year after a siege of 12 days and a large loss of life.

JHELAM, jĕ′lŭm, or **JHELUM**. The ancient Hydaspes, the westernmost of the five rivers of the Punjab, India. Its source is at Vernag in Kashmir, 12 miles east of Shahabad, where it issues from an octagonal tank in a garden fed by springs from the Bunihal Pass in the Western Himalayas (Map: India, B 2). Its course is northwest past Islamabad and Srinagar to the Wulur Lake, whence it flows southwest through the Barambula Pass and again northwest to Mazufurubad. Here it bends directly southward and forms the boundary of Kashmir and the Punjab to Jhelam, where it assumes a southwesterly trend and, continuing past Jalalpur, Pind Dadan Khan, Bhera, Shahpur, and Shahiwal, joins the Chenab below Kadirpur after a course of 490 miles. It is navigable by river craft for the greater part of its course and abounds in fish. On its banks Alexander the Great built a war fleet and fought a battle with Porus. It is an important Himalayan example, in its pathway through Kashmir, of a wide and fertile plain made by a locally aggrading stream which has caused a vast deposit of alluvium and much meandering.

JHERING, yā′rĭng, Hermann von (1850–). A German naturalist in Brazil. A son of the jurist, Rudolf von Jhering, he was born in Kiel and was educated at Giessen, Leipzig, Berlin, and Göttingen. He was privatdocent at Erlangen and Leipzig until 1880, when he went to Brazil. There he became naturalist of the Museu Nacional in Rio de Janeiro and later director of the Museu Paulista in São Paulo. The name Amphineura and the grouping of the Neomenia, Chætoderma, etc., under this name were due to him (1876), though he erroneously included them in a division of worms; and his work in zoölogy, paleontology, and anthropology has a particular value because of his knowledge of South America. He edited the *Revista do Museu Paulista* (1895 et seq.) and wrote: *Vergleichende Anatomie des Nervensystems und Phylogenie der Mollusken* (1877); *Rio Grande do Sul* (1885); *Anthropology of the State of São Paulo* (2d ed., 1906).

JHERING, Rudolf von (1818–92). A German legal scholar, born at Aurich, Hanover, and educated at Heidelberg, Munich, Göttingen, and Berlin. He became instructor at Berlin (1843) and professor at Basel (1845), Rostock (1846), Kiel (1849), Giessen (1852), Vienna (1868), and Göttingen (1872). He was made a noble by the Emperor of Austria in 1872. Trained in the historical school, Jhering forsook it for a philosophical method which aimed to show the psychological development of law by examples drawn from the national character of the Romans. This was in direct contravention to Savigny's method. Jhering's great work (unfinished), which brought him rank as one of the foremost of nineteenth-century authorities on jurisprudence, was *Geist des römischen Rechts auf den verschiedenen Stufen seiner Entwickelung* (1852–65; 6th ed., 1907 et seq.; It. trans. by Bellavite). He published also: *Zivilrechtsfälle ohne Entscheidungen* (1847; 11th ed., 1909); *Die Jurisprudenz des täglichen Lebens* (1870; 13th ed., 1909; Eng. trans. by H. Goudy, *Law in Daily Life*, 1904); *Der Kampf ums Recht* (1872; 17th ed., 1910); *Der Zweck im Recht* (2 vols., 1877–83; 4th ed., 1904–05; Eng. trans. of vol. i by I. Husik, *Law as a Means to an End*, 1914); *Scherz und Ernst in der Jurisprudenz* (1885; 10th ed., 1909); and the posthumous *Entwickelungsgeschichte des römischen Rechts* (1894), and *Vorgeschichte der Indoeuropäer* (1894). With Karl Gerber he founded in 1856, and thereafter edited, the *Jahrbücher für die Dogmatik des heutigen römischen und deutschen Privatrechts*. Consult: A Merkel, *R. von Jhering* (Jena, 1893); E. Hurwicz, *Rudolf von Jhering und die deutsche Rechtswissenschaft* (Berlin, 1911), with bibliography; Gustav de Szászy-Schwarz, "Rudolf Jhering et son œuvre," in *Revue de Hongroie*, vol. xii (Budapest, 1913).

JIB (from Dan. *gibbe*, Swed. *gippa*, Dutch *gijpen*, to turn suddenly, jibe). A triangular sail which is set on the *jib stay*, a rope extending from the jib boom or extremity of the bowsprit to the fore-topmast head. Nearly all sailing vessels larger than a catboat have jibs, the exceptions being mostly vessels with a lateen rig. The forward and upper side of a jib lies along the stay, to which it is secured by *hanks* or *travelers*, and is inclined to the horizon at an angle varying from 30 to 60 degrees. The after edge or leech is more nearly vertical, and the foot is almost horizontal. The jib serves to balance the effect of the after sails and keep the ship's head from coming up to the wind. The *jib boom* is a spar projecting from the bow of a vessel over which the jib is set. In large sailing ships the jib boom projects through a hole in the bowsprit cap, and its inner end or heel is secured on top of the bowsprit. Sometimes there is a *flying jib boom*, a light spar lying partly on the jib boom, to which it is secured, and projecting beyond it to give a lead to the flying jib and foreroyal stays. The *flying jib* is a sail similar to the jib, but smaller, and is set on the flying jib stay. The *jib foresail* is the forestaysail of a sloop. The *jib guy* is a rope giving lateral support to the jib boom. It leads from the head of the latter to the end of the whisker boom and then to the forecastle rail. When two sails are set between the fore-topmast stay and jib stay, they are called *inner* and *outer jibs*.

The *jib netting* is a network with meshes 4 to 6 inches across, which is placed under the jib boom and seized to the whisker booms and jib guys. It serves to keep the jib from hanging down into the water when hauled down and is a safeguard to the men furling it in heavy weather. The *jib stay* is a rope forming part of the standard rigging of a ship and serves to set the jib upon. It leads from the fore-topmast head to a sheave or hole in the outer end of the jib boom, thence under a cleat on the dolphin striker and in to the bow. The *flying jib stay* is a rope similar to the jib stay, but leading from the fore-topgallant masthead to the end of the flying jib boom, thence to the dolphin striker and to the bow. The *jib topsail* is a light sail on the topmast stay of a small schooner or sloop. See SAIL.

JIBE. To shift over a boom mainsail or spanker when the wind is aft, or nearly aft, so that the wind will fill it on the other side. When the sail is a large one, the sudden change of the wind pressure from one side to the other usually causes the vessel to heel over at a considerable angle, and if the operation is carelessly done in a strong breeze the vessel may capsize. The operation of wearing in a small fore-and-aft rigged vessel is usually called *jibing*, on account of the jibing of the mainsail. Jibing the spanker is of rare occurrence, as it is usually taken in when the wind is very far abaft the beam.

JIBO'A, or **JIBO'YA.** A native name in Brazil for a boa—more particularly, on the Amazon, the thick-necked boa. See BOA.

JICARILLA, hĕ'kȧ-rē'lyȧ. A tribe of Athapascan stock formerly occupying parts of Arizona and New Mexico. They were composed of two bands—the Llanero ranging east of the Rio Grande, the Ollero to the west. Both bands are now living on a reservation in northern New Mexico and number 694. They are generally considered a division of the Apache (q.v.), because of similarity in language, but have always been politically independent. Their culture bears some resemblance to that of the Plains Indians. Consult P. E. Goddard, "Jicarilla Apache Texts," in American Museum of Natural History, *Anthropological Papers*, vol. viii (New York, 1911), and id., *Indians of the Southwest*, in American Museum of Natural History, "Handbook Series," No. 2 (ib., 1913). See INDIANS.

JICIN, yĕ'chĕn. A town of Bohemia. See GITSCHIN.

JID'DAH, or **JEDDAH** (Ar. *Juddah*). The most important trading port on the Red Sea, situated on the coast of the Hejaz, Arabia, about 60 miles west of Mecca (Map: Turkey in Asia, D 7). It is a well-built, prosperous-looking walled city, with wide streets and fine buildings, the chief of which are the Governor's residence, the customhouse, the mosques. and the fort. The climate is exceedingly hot and the water supply defective. Jiddah was formerly the trading centre between Arabia and Africa, and its annual commerce amounted to about $4,500,000, but now is less than one-quarter of that amount. The city is more important as a landing place for pilgrims to Mecca than a trading centre, though it is still the chief market for pearls, mother-of-pearl, black coral, coffee, balsam, aromatic herbs, horses and donkeys, and a depot for Oriental carpets and other goods. Two lines of steamers connect it with Suez, the Suez-Aden boats touch here, and consulates of most of the powers are maintained. More than 60,000 pilgrims pass through the city yearly, and outside the city is one of the holy places of the Moslem world, the tomb of Eve. During the Wahhabite wars Jiddah was taken by the Egyptians. Since 1840 it has belonged to Turkey. On June 15, 1858, Christian missionaries were murdered in the city, and a month later it was besieged for three days by an English man-of-war. The population is estimated at 30,000 and is exceedingly heterogeneous.

JIG, or **GIGUE,** zhēg (OF., Fr. *gigue*, jig, OSp., OIt. *giga*, fiddle, from MHG. *gige*, Ger. *Geige*, Icel. *gigja*, fiddle). The name of a short piece of music much in vogue in olden times, of a joyful and lively character, and in $\frac{3}{8}$ or $\frac{3}{4}$, also in compound time ($\frac{6}{8}$, $\frac{6}{4}$, etc.); used formerly as a dance tune. It consists of two parts of eight bars each, and the shortest notes are quavers. When it became a regular part of the suite (q.v.), its dimensions were extended. It was customary to close all suites or partitas with a *gigue*. The dance is rapid and irregular, and, although originally a form of country-dance, has been modified by its introduction into various countries until scarcely anything of its early character remains.

JIG. A device for separating heavy minerals of an ore from the barren gangue rock, or for separating two or more minerals varying considerably in specific gravity. Hand jigs are used on small operations or by prospectors, and mechanical jigs for larger operations. The hand jig consists of a square box having a screen for the bottom; this box is suspended from a spring pole or lever in a larger box containing water; a charge of ore is shoveled into the suspended box, and an up-and-down or jigging motion imparted to it through the spring pole. The heavy ore or mineral settles to the bottom, and lighter rock which rises to the surface is removed by hand. Mechanical jigs consist of a series of boxes or one long box separated into from three to six independent compartments by cross vertical partitions; each compartment is then divided into two sections by a longitudinal vertical partition which extends from the top of the box to a depth of about one-third of the height of the box; this longitudinal partition permits the passage of water between the two sections. One side of each compartment is then fitted with a fine screen or grating, and the other side is fitted with a plunger. The plunger is suspended by a steel rod, or support, from an eccentric which revolves around a central longitudinal shaft. Each compartment is then filled with water; sized ore is fed to the screen with a stream of water to wash the surface of the material to succeeding boxes; and the central shaft is then revolved, causing the plungers to move up and down, resulting in the water first being forced into the section containing the ore and then being sucked back. The crushed ore is raised en masse from the screen bottom by the force of the water, thereby permitting the heavy minerals to fall back to the screen in advance of the lighter ore or waste rock. This continued action of the plunger results in layers being formed of heavy minerals next to the screen and the lighter minerals and waste on the surface; the surface material is washed by the surface current of water to the second and succeeding compartments. The minerals which have settled are drawn from each compartment through an automatic gate. With lead-zinc sulphide ores in a siliceous gangue the first compartment will collect and discharge practically pure galena (lead sulphide), which is the heaviest mineral; the second compartment will discharge a middlings product consisting of galena attached to silica and galena attached to blende (zinc sulphide); the third compartment will discharge practically pure blende; the fourth compartment will discharge a middlings product of blende attached to silica; and the fifth compartment, a very low-grade middlings product. All of the middlings product must be recrushed, sized, and re-treated. From the tail end of the compartments the waste rock is washed away by the surface current of water. A small amount of water is fed constantly to the plunger side of each compartment. This type is known as the Hartz jig.

The size of each section or screen area varies greatly; usually it is 10 to 12 inches wide by 20 to 24 inches long; the Cooley jig, used in Joplin, Mo., is 18 to 24 inches wide by 24 to 36 inches long. The Hancock jig differs from the Hartz jig in that the screen forms the bottom of a movable box suspended in water which is raised and lowered mechanically by supports connected to an eccentric. The action of this jig is identical to that of the Hartz jig, gives very satisfactory results, and has a large capacity. Various types of jigs are manufactured, differing in methods of drawing off the products and in design of eccentric, but the principle of separation is the same in all types.

With heavy ores it is customary to feed nothing over about ½ inch or under 1/10 inch; there are a few exceptions to this. With coal mixed with slate the largest size is usually about 1½ inches. The preliminary sizing for the most efficient work consists of separating into such sizes that the smallest grain of heavy material will settle with the same velocity as the largest grain of light mineral. In the separation of blende (zinc sulphide) from quartz gangue the most efficient results are obtained by sizing into the following products: coarse, ½ to ¼ inch; medium, ¼ to ⅛ inch; and fine size, ⅛ to 1/16 inch; the fine size is often fed to concentrating tables. See ORE DRESSING.

JIGGER, jĭg′ẽr (corruption of *chigoe*, the native name), or RED BUG. See CHIGOE, 2.

JILL. See JACK AND JILL.

JIM CROW. A negro song (1835) introduced by T. D. Rice in Louisville, Ky., and at the Adelphi in London.

JIMÉNES, hê-mā′nâs. See XIMÉNES.

JIMÉNES DE CISNEROS, FRANCISCO. See XIMÉNEZ DE CISNEROS, FRANCISCO.

JIMÉNES DE QUESEDA. See XIMÉNEZ DE QUESADA.

JIMÉNEZ DE RADA, dâ rä′DȧA, RODRIGO (c.1170–1247). A Spanish historian, born probably in Navarra. He was educated in Paris, entered the Franciscan Order, and became Archbishop of Toledo in 1208. Afterward he was made Cardinal. His contemporaries considered him the most scholarly cleric in the world. He wrote at the bidding of St. Ferdinand of Castile his *Historia Gothica* (so named by him, but more commonly called *Chronica Rerum Gestarum in Hispania*), which he himself translated into Castilian as the *Historia de los Godos* (c.1241). It covers the time from the invasion of the Goths to the year 1243 and was exceedingly influential in the world of letters.

JIM′MU TEN′NO (Sinico-Japanese, Jimmu the Emperor). The first ruler of Japan, and the reputed founder of the line of mikados that has continued to the present time, Yoshihito, the Mikado now (1915) on the throne, being the hundred and twenty-second or, according to some, the hundred and twenty-third. He was said to have been a descendant in the fifth degree of Ten-sho Dai-jin, or Amaterasu, the sun goddess. His reign is said to have begun in the year 660 B.C. and to have ended in 581 B.C., after having conquered all his enemies in the south and west and established his throne in Yamato, the central part of the main island of Japan. There he married a lady named Hime-tatara-isuzu-himeno-mikoto, daughter of one of the rulers of the country. He is said to have died at the age of 137. His burial place is situated on an isolated hill on the northeast side of Mount Unebi in Yamato. His anniversary is February 11, when salutes are fired in his honor. The era of Jimmu Tenno is that from which the Japanese reckon. If he ever existed, he was probably one of the early—or perhaps the earliest—invaders of Japan, entering the country from the southwest.

JIMSON WEED. A weed of the nightshade family. See STRAMONIUM.

JINGAL, jĭn′gal (Hind. *jangāl*, Marathi, *jejāl*, swivel gun). A long, heavy musket or small gun, using a ball weighing a quarter of a pound or more, formerly much used in China and Korea and still employed to some extent. It is supported when being aimed by an iron crutch pivoted about the middle of the barrel. It is usually breech-loading, and fitted to be charged by a separate brass chamber inserted into the bore and held in place by a wedge-shaped key.

JINGLE, ALFRED. See PICKWICK CLUB.

JINGLE SHELL. A species of *Anomia*, a bivalve shell related to the oyster, in which the upper valve is convex, smooth or rough, while the lower valve is concave, with a deep rounded notch in front of the cartilage process; the animal is anchored by a plug passing through the notch in the lower valve. It lives attached to oysters and other shells, and these are modified so as to acquire the irregular form of the surface on which they rest. One species lives on the coast of northeastern America; but the jingle shell proper is a larger golden-yellow species from the tropics.

JIN′GOISM (from *jingo*, perhaps a corruption of St. *Gingulphus*, or a corruption of Basque *Jinkoa*, *Jainkoa*, *Jeinkoa*, contracted from *Jaungoicoa*, *Jangoicoa*, lord of the high, God). A term coined from the ancient slang expression "by Jingo," owing to an incident of British politics in 1877, when England was undecided whether to interfere forcibly in the war between Russia and Turkey. The Liberals, led by Gladstone, were in favor of leaving Turkey to itself, while the Conservatives, under Lord Beaconsfield, the Premier, were determined to protect Turkey from Russia. During the winter of 1877–78 the excitement in London became intense, and wherever the fighting spirit prevailed it freely found vent in a doggerel first sung at a music hall:

> "We don't want to fight, but by Jingo, if we do,
> We 've got the ships, we 've got the men, we 've got the money too."

"Jingo!" shouted with a significant emphasis, was derisively cast as a nickname at the warlike party. The term, corresponding to "spread-eagleism" in America and *chauvinisme* in France, has ever since been applied to the warlike advocates of British Imperial sway and has been taken up with a similar meaning in the United States. Consult J. A. Hobson, *The Psychology of Jingoism* (London, 1901), and F. H. S. Escott, "The Analysis of Jingo," in the *Fortnightly Review*, vol. lxxvii (ib., 1902).

JINGO-KOGO, jĭŋ′gô-kō′gō (Sinico-Japanese, Jingo the Empress). A legendary ruler of Japan, named Okinaga-Tarashi-Hime, wife of Chuai Tenno, the fourteenth Mikado (191–200

A.D.). A rebellion having broken out in Kiushu, he set out to suppress it, accompanied by his wife, then with child. He died in camp, a fact which she suppressed, and, having appointed a general to continue the war there, she assumed the regency, assembled another great army, and fitted out a fleet to invade Korea. She led the expedition in person, and so formidable was the armada that the King of Shiraki became terror-stricken on its approach and immediately submitted, swearing to pay tribute to Japan forever. The kings of Koma and Kudara also submitted on the same terms; and, laden with gifts and bringing many hostages, the warlike Regent returned after an absence of nearly three years to Japan and gave birth to a child, who afterward became Ojin Tenno, the fifteenth Mikado, and later was canonized as Hachiman, the god of war. As Regent, his mother ruled Japan until 270 A.D. She is worshiped to this day under the name of Kashi Dai Myojin. On her legendary conquest of Korea are based the traditional claims of Japan upon that country.

JINIGARÁN, hē′nē-gȧ-rän′, or **GINIGARÁN**. A town of the Province of Negros Occidental, Philippines, situated on the west coast of the island of Negros, on the Guimras Strait, 29 miles south of Bacólod. Pop., 1903, 14,256.

JINN (Ar., from *janna*, to be veiled, be dark), often written Genii. Supernatural beings of Arabic folklore and religion. Mohammed believed in their existence, and the seventy-second sura of the Koran is named after them. According to tradition, the Prophet recognized five orders of such creatures. They are both male and female; eat, drink, and propagate their kind, and die, though they generally live very long. Some are good, some bad; some are Mohammedans, some infidels. They were created 2000 years before Adam, of smokeless fire, and in the early time were ruled by a race of kings each named Solomon. Their home is the mountain called Kaf, supposed to encompass the earth; but they haunt all sorts of places, rivers, ruined buildings, ovens, baths, etc. They are in the sea, on land, and in the air. They assume what form they choose, and appear to men as dogs, cats, serpents, and in other animal forms, as human beings, and in the whirlwinds, dust clouds, and the like. They are the authors of many of the ills to which men are subject, but also confer benefits, and, in general, whatever the mind of the untutored cannot conceive of as done by human means is ascribed to them. It was they who built the pyramids. Solomon, son of David, acquired great power over them, and innumerable stories are told of the great things he accomplished with their help. They are identical with the spirits and demons that play so large a part in the religious literature of the Babylonians and Assyrians. Consult: Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898); Fossey, *La magie assyrienne* (Paris, 1902); and, for the Arabian demons, Lane, *Manners and Customs of the Modern Egyptians* (London, 1837); id., *The Thousand and One Nights*, notes (ib., 1838–40).

JINNISTAN. See Djinnestan.

JINRIKISHA, jĭn-rĭk′ē-shȧ (Sinico-Japanese, man-power vehicle). A light two-wheeled hooded carriage, much resembling a miniature hansom cab without the driver's seat at the back. It is drawn by a man, however, instead of a horse. Near the outer end of the shafts is a crosspiece used by the runner in pulling the carriage. With a cord attached to the crossbar, one or two or more outrunners can assist when extra speed is needed or the burden is especially heavy, though ordinarily the jinrikisha is almost wholly a single or double passenger vehicle only. The *hiki*, or puller, is not usually troubled with very much clothing in summer time. He can go at a great pace for long distances, frequently from 30 to 40 miles a day, arriving at his destination apparently as fresh as when he started. An American Baptist missionary named Goble claimed the invention of the jinrikisha, in 1869; but Takayama Kosuka, of Tokyo, was the first to obtain government permission to run the new vehicles, early in the same year, and another Japanese improved the rude original by supplying springs and designing the hood or calash top, adding wheel guards. Then followed a period of lavish decoration. The change from the *kago*, or palanquin, was easily made, the bearers becoming pullers. At present the decoration is very simple, generally confined to the family crest or to a single symbol. The jinrikisha has been introduced into several Asiatic countries and in India is vulgarly called ricksha and has even found a place in literature. Useful applications of this vehicle have been made in the army.

JIRÁSEK, yē′rä-shĕk, Alois (1851–). A popular Bohemian historical novelist and dramatist, born at Hronov. In 1888 he became professor in a Gymnasium at Prague. His numerous novels, covering Bohemian history from the earliest times, evince great faithfulness to historical truth. They include: *Nevolnice*, on the heathen period; a trilogy *Mezi proudy* (Between the Streams), on the times of Huss; and *Maryla* and *V cizích službách* (In the Foreign Service), dealing with the period after Huss. His collected works, including several dramas, were published at Prague (1899 et seq.).

JIREČEK, yē′rä-chĕk, Hermenegild (1827–). A Bohemian writer on Slavic law, born at Hohenmauth (Vysoké Mýto) in Bohemia and educated at Prague. He became an official in the Department of Public Education when he was 27. His earliest literary activity was in the field of fiction, and he published a collection of tales, *Novely*, in 1853. His writings on Slavic history, law, and literature include: *Ueber Eigentumsverletzungen und deren Rechtsfolgen nach dem altböhmischen Rechte* (1855); *Die Echtheit der Königinhofer Handschrift* (1862), with his brother Josef, in which he defended the authenticity of a document now generally admitted to be spurious; in Bohemian, a work on Slavic law up to the thirteenth century (1863–73); a collection of Slavic folk laws (1880); *Codex Juris Bohemici* (1867–98); *Antiquæ Boemiæ Topographia Historica* (1892); and *Unser Reich vor 2000 Jahren* (1893), continued by *Unser Reich zur Zeit der Geburt Christi* (1896).

JIREČEK, Josef (1825–88). A Bohemian educator, scholar, and critic, brother of the preceding, born at Hohenmauth and educated at Prague. In 1871 he was made Minister of Public Instruction in Hohenwart's cabinet, from which he was forced by German opposition. A faithful subject of the Emperor, he entered the Austrian Reichsrat in 1879. His earlier literary work was mainly educational, including the valuable manual *Anthologie z literatury české* (1858–61). Besides his work in Old Czech grammar, and an essay written together with his brother, Hermenegild Jireček, entitled *Die Echtheit der Königinhofer Handschrift* (1862), mention should be made of his valuable reprints from Bohemian literature, including works of Koldin (1876) and Dalimil's chronicles (1878); of the two histories of literature, general and encyclopædic, to the close of the eighteenth century, *Rukovět k dějinám literatury české* (1874–75), his most important work, and the other dealing with Bohemian hymnology, *Dějiny církevního básnictví ceského* (1878); of an anthology (1858–61) and biographical dictionary (1875–76) of Czech literature; of his contributions to *Slovník naučný*, the Bohemian encyclopædia; and of his edition of the collected works of his father-in-law, Paul Safařík (q.v.). Consult Helfert, *Joseph Jireček* (Vienna, 1890).

JIREČEK, KONSTANTIN JOSEF (1854–). A Bohemian writer on Slavic history, son of Josef Jireček, who had married a daughter of Safařík. He was born in Vienna and was educated at Prague, was appointed docent of history at the University of Prague (1877), and after traveling in the South Slavic countries was made secretary (1879) and chief (1881) of the Bulgarian Ministry of Education. Having resigned, he became President of the Council of Public Instruction and director of the museum and library of Sofia. He returned to Prague in 1884, to teach universal history in the Bohemian University, and in 1893 was appointed professor of Slavic history at Vienna. In 1898 he was made a member of the Vienna Academy of Sciences. His works, mostly on the Balkan Slavs, include, among others: *Geschichte der Bulgaren* (1876; also in Czech and Russian); in Bulgarian, a bibliography of that literature (1872); *Die Heerstrasse von Belgrad nach Konstantinopel und die Balkanpässe* (1877); *Die Handelsstrassen und Bergwerke von Serbien und Bosnien im Mittelalter* (1879); in Czech, *Excursions in Bulgaria* (1880); *Das Fürstentum Bulgarien* (1891); *Die Romanen in den Städten Dalmatiens während des Mittelalters* (1901–04); *Geschichte der Serben*, vol. i (1911), the standard history of Servia. A bibliography of Jireček was published in the *Transactions* of the Society of Sciences of Sofia (1905).

JIRÓN, hē-rōn′. A town of the Department of Santander, Colombia, on the Río de Oro, 6 miles southwest of Bucaramanga. There are gold washings in the river. The surrounding region produces cacao, coffee, quinine, and tobacco. Its industries are the manufacture of hats and cigars, and it has trade in tobacco, hats, and cattle. It was founded in 1631. Pop., 1912, 5898.

JITOMIR, zhĭ-tō-mēr′. A city of Russia. See ZHITOMIR.

JIUJITSU. See JUJUTSU.

JIVARO, hē-vä′rō. An important confederacy or group of tribes apparently constituting a distinct stock, scattered in the forests along the Marañon (Amazon), chiefly on the north or Ecuador side, about the confluence of the Pastaza and Santiago. They are a vigorous, wild, and warlike people, but at the same time honorable and faithful, and were never subjugated by the Incas (see QUICHUA), and only temporarily brought under the dominion of the Spaniards, whom they expelled in a general revolt in 1599. Their general appearance indicates muscular strength and activity and quick intelligence. They live in well-built wooden houses, with platform beds instead of hammocks; cultivate corn, beans, and bananas, and weave cotton cloth. They use the blowgun, bow, lance, and shield, and wear their hair long and flowing, with headdresses of bright feathers. Their ordinary dress is a shirt without sleeves and a pair of short trousers, but in war they are stripped and painted. They are noted for preserving the dried heads of enemies slain in battle (see HEAD HUNTING) and for the practice of taking a strong emetic every morning as a preparation for the day's work. They have developed a system of signaling by means of large drums kept in every village, by which the approach and strength of an enemy can be made known, or the warriors called to battle. Consult Rivet, *Les indiens jibaros* (Paris, 1908), and Beuchat and Rivet, in *Anthropos*, vols. iv, v (Salzburg, 1909–10).

JO′AB (Heb. *Yōāb*, Yahwe is father). Son of Zeruiah and nephew of King David, as well as commander of David's army (2 Sam. ii. 13; 1 Chron. xi. 6). He performed valuable services for David, his chief achievements being the overthrow of the army of Saul's son, Ishbosheth, led by Abner (2 Sam. ii. 12–31), his wars against the Ammonites (xi; xii. 26–31), and his overthrow of the conspiracy of Absalom (chap. xviii). For killing Absalom contrary to orders David deposed him in favor of Amasa (2 Sam. xix. 14), and soon after he treacherously slew his rival (xx. 8–10). At the close of David's life Joab joined Adonijah in his attempt to secure the succession to the throne and was executed by Solomon's order after David's death (1 Kings ii. 28–34).

JOACHIM, yŏ′à-kêm, JOSEPH (1831–1907). A distinguished Hungarian violinist. He was born at Kittsee, near Pressburg, Hungary, of Jewish parents. His father was engaged in commercial pursuits, but discovered his son's musical proclivities, and at the age of five years placed him under Szervaczinsky, the celebrated concert master of Budapest. After two years' study he made his first public appearance, playing duets with his master, after which he studied under Böhm at Vienna. In 1841 he was a pupil at the Vienna Conservatory, studying counterpoint under Hauptmann, and in 1843, when only 12 years of age, distinguished himself at a concert of Madame Viardot-Garcia in Leipzig. In the spring of 1844 he visited England, where he was enthusiastically received, returning to Leipzig in November of the same year to play at one of the Gewandhaus concerts. Adopting the advice of his friends David and Mendelssohn, he determined to continue his studies at Leipzig. He made visits to England at intervals until 1862, after which his appearance in London became an annual event. He was appointed concert master in 1849 of the orchestra at Weimar during the régime of Liszt, whose views were so diametrically opposed to his own ideals that a disagreement was inevitable. He left Weimar in 1854 to accept the post of concert conductor and solo violinist at the court of Hanover, where he married Amalie Weiss, a well-known contralto singer. In 1868 he was appointed head of the Hochschule für ausübende Tonkunst. His most important work is the Hungarian Concerto in D minor. His other compositions include overtures and incidental music to various plays; several marches and trios; ballads, and various forms of chamber music. His most salient characteristics as a player are reflected in the general character of his written work, which is marked by sincerity, depth, and tenderness. It was as a quartet player, however, that his intellectual superiority over contemporary violinists was most marked; his quartet party, consisting of himself, as first violin, De Ahna, second violin, Hausmann, 'cello, and Wirth, viola, have never been excelled. As a soloist, he earned for himself the title of king of violinists. He was known as the greatest master of style, repose, and tone of his day. Consult: A. Moser, *Joseph Joachim* (Berlin, 1904); J. A. Fuller-Maitland, *J. Joachim* (London, 1905); *Letters from and to Joseph Joachim*, selected and translated by Nora Bickley (ib., 1914).

JOACHIM, ORDER OF SAINT. A secular order founded in 1755 by the Duke of Saxe-Coburg-Saalfeld and other nobles and originally called the Order of Jonathan. The device of the order was: *Deo, Principi, Legi.* Its objects were benevolent. It had three classes, and its membership was restricted to the nobility. The order disappeared about 1840.

JOACHIM FREDERICK (1546–1608). A German bishop and Elector of Brandenburg, son of the Elector John George. He was made Bishop of Brandenburg and Havelberg, and Archbishop of Magdeburg. In 1570 he married and so forfeited his archiepiscopal seat in the German Diet. In 1598 he succeeded to the electorate and made his son, Christian William, Bishop of Magdeburg. He founded the Joachimsthal Gymnasium of Berlin.

JOACHIM (jŏ′ȧ-kĭm) **OF FLO′RIS** (c.1145–c.1202). A monk of the twelfth century, reverenced as a prophet by many in his own time and for two centuries later. He was born at Celico, near Cosenza, Calabria, about 1145, became a Cistercian monk, and in 1177 is mentioned as abbot of Coraca. After some years he resigned and betook himself to the wilderness near Cosenza for study. There he founded a monastery, San Giovanni in Fiore, 25 miles east of Cosenza, and a new order (Ordo Florensis). His order was absorbed by the Cistercians in 1505. Joachim divided all time into three dispensations: (1) that of the Father from the creation to the birth of Christ; (2) that of the Son, from the birth of Christ to 1260; (3) that of the Spirit, from 1260 to the end. His three principal writings are: *Liber Concordiæ Novi ac Veteris Testamenti* (printed at Venice, 1519); *Psalterium Decem Chordarum* (1527); *Expositio Apocalypsis* (1527). Some of his opinions concerning the Trinity were condemned by the Lateran Council of 1215. In 1254 a Minorite, Gherardino, of Borgo, San Donnino, who considered Joachim's works inspired, brought them out with an introduction, in which he described them as the "Everlasting Gospel" (*Evangelium æterne*). He made a sensation and led to their condemnation by the University of Paris on 31 propositions taken from his introduction and the writings of Joachim. Pope Alexander IV in 1255 examined by commission these alleged heretical statements, with the result that Gherardino was censured, but Joachim was not.

Bibliography. The earliest lives extant are published by the Bollandists in *Acta Sanctorum* (Antwerp, 1643–86). Consult: Xavier Rousselot, *Etude d'histoire religieuse aux 12e et 13e siècles, Joachim de Flores, Jean de Parma et la doctrine de l'évangile éternel* (2d ed., Paris, 1867); Döllinger, *Fables Respecting the Popes of the Middle Ages* (Eng. trans., New York, 1872); Schneider, *Joachim und die Apokalyptiker des Mittelalters* (Dillingen, 1873); Wilhelm Preger, "Das Evangelium Æternum und Joachim von Floris," in *Munich Akademie der Wissenschafte, historische Classe, Abhandlungen*, vol. xii (Munich, 1874); Haupt, *Zur Geschichte des Joachimismus* (Gotha, 1885); J. E. Renan, "Joachim de Flore et l'évangile éternel," in his *Nouvelles études d'histoire religieuse* (Paris, 1899); P. E. L. Fournier, *Etudes sur Joachim de Flore* (ib., 1909).

JOACHIMSTHAL, yŏ′ȧ-κēms-tăl′. An ancient town in Bohemia, Austria, situated in the Erzgebirge at an elevation of 2365 feet, 12 miles north of Karlsbad (Map: Austria, C 1). It has a fine modern church and a sixteenth-century Rathaus with a library. In ancient times Joachimsthal was famous for its silver mines, and the Joachimsthaler, coined from native silver by the counts of Schlick after 1517, had a very wide circulation. The name was subsequently abbreviated to the modern German thaler. (See DOLLAR.) The present silver output is only nominal. Uranium is worked in quantities (there is a plant for its commercial production), also bismuth and nickel. The government has bought the pitchblende mines here and produces radium. A tobacco factory employs 1200 hands; there are manufactures of gloves, paper, lace, corks, and dolls. Pop., 1900 (commune), 7378; 1910, about 8000.

JOAN, jȯ-ăn′ *or* jōn, POPE. The name of a supposed female occupant of the papal chair following Leo IV (died 855) and preceding Benedict III (died 858). The story represents her as born in Germany of English parentage. Assuming the dress and character of a man, she went to Athens and thence to Rome, where, under the name of Johannes Anglicus (John of England), she is alleged to have gained distinction as a scholar, entered holy orders, and risen through various gradations to the papal sovereignty itself. The story goes on that she was seized with the pains of childbirth on the occasion of a public procession and died in delivery. The legend takes various forms in different writers. The story of a female pope is told by a French Dominican, Steven of Bourbon (died c.1261), in his work upon the *Seven Gifts of the Holy Spirit.* He is thought to have copied from an earlier Dominican, John of Mailly. A third Dominican, Martin Polonus or Martin of Troppau (died 1278), helped to spread the story. Its unhistoric character was first shown by the French Calvinist David Blondel, *Eclaircissement de la question si une femme a été assise au siège papal de Rome* (Amsterdam, 1647); *De Joanna Papissa* (ib., 1657), and is now universally admitted. It probably grew up from the survivals of local folk tales and the explanations of certain antiquities and Roman customs. Consult: Friedrich Spanheim, *Histoire de la papesse Jeanne* (2 vols., The Hague, 1736); Alexander Cocke, *Present for a Papist; or, The History of the Life of Pope Joan* (London, 1740); Wensing, *Over de Pansin Johanna* (The Hague, 1845); Döllinger, *Fables Respecting the Popes of the Middle Ages* (Eng. trans., New York, 1872); E. D. Rhoïdes, *Pope Joan* (Eng. trans., London, 1886).

JOAN′NA (1479–1554). Queen of Castile. She was the second daughter of Ferdinand the Catholic of Aragon and Isabella of Castile. She married Philip, son of Emperor Maximilian I, and by the death of her brother and her elder sister and the latter's infant son she became heiress to the crowns of Castile and Aragon. On the death of Isabella, in 1504, Joanna succeeded as Queen of Castile, but, as she was partially insane, she did not actually rule. On the death of her husband (1506) she became wholly insane and passed the rest of her life in the castle of Tordesillas. Her son Charles became King of Spain in 1516 and Holy Roman Emperor, as Charles V, in 1519. Her younger son, Ferdinand, became Roman Emperor in 1556. Consult W. H. Prescott, *History of Ferdinand and Isabella* (many editions).

JOANNA I (c.1327–82). Queen of Naples from 1343 to 1382, Queen of Sicily after 1356, and Countess of Provence. She was the daughter of Charles, Duke of Calabria, and of Marie of Valois, and became Queen on the death of her grandfather, Robert the Wise. She was already married to her cousin Andrew, brother of Louis the Great, King of Hungary. This marriage had been made when they were mere children, in order to conciliate the rival claims to the throne of the two branches of the house of Anjou. By the will of Robert Joanna was proclaimed his heiress; Andrew was to be only Coregent and Duke of Calabria. Moreover, Joanna was to become Queen only when 25 years of age. This will was unsatisfactory to all parties. Joanna succeeded in having herself crowned at once by the authority of the Pope; by the influence of Louis the Great Andrew was also crowned. In 1345 the latter was murdered by conspirators, who, it was generally believed, were instigated by Joanna. Louis of Hungary declared war to avenge his brother's murder. In 1347 Joanna married Louis of Taranto, but both were soon driven out by Louis the Great, who captured Naples and had himself crowned King. He was soon compelled to return home, as his army was decimated by the plague. In the meantime Joanna and her husband had taken refuge with the Pope at Avignon. They secured money by selling to the latter Avignon, which was a fief held by Joanna. They returned to Naples and drove out the Hungarian garrisons. Louis the Great made another expedition in which he was at first successful. Then he met with reverses which led to a treaty suspending hostilities on condition that Joanna should be tried for the murder of Andrew and if found guilty should forfeit the kingdom to Louis. She was adjudged innocent in 1352 by the papal court, and she and Louis of Taranto were crowned. The latter died in 1362, and Joanna married, about a year later, James of Aragon, titular King of Majorca. She allowed him no share in the government, and he spent his life in quest of adventure, generally outside the Kingdom of Naples. After he died, in 1375, Joanna married Otho of Brunswick, who received the title of Prince of Taranto. When Urban VI and Clement VII were elected to the papacy by the rival factions of cardinals (1378), Joanna favored the latter. Urban thereupon crowned Charles of Durazzo King of Naples, which he claimed to control as a papal fief. Charles, who was a cousin of Joanna, had been named by her as her successor before her last marriage. Later she had changed her will and named as her heir Louis of Anjou, brother of Charles V, King of France. Charles of Durazzo, with the aid of the Pope and of Louis the Great, succeeded in capturing Joanna and had her put to death, May 22, 1382. She had two children who died in infancy. Joanna was a wise ruler, capable and generous. Her court was renowned for its magnificence. Consult: Battaglia, *Giovanna prima, regina di Napoli* (Padua, 1835); Baddeley, *Queen Joanna I of Naples, Sicily, and Jerusalem* (London, 1893); Scarpetta, *Giovanna I di Napoli* (Naples, 1903); Francesca M. Steele, *The Beautiful Queen Joanna I of Naples* (London, 1910).

JOANNA II (1371–1435). Queen of Naples from 1414 to 1435. She was a daughter of Charles III of Durazzo and was the successor of her brother Ladislas. Her first husband was William of Austria, her second James of Bourbon, Count of La Marche. She was of a very dissolute character, and her government was disturbed by constant feuds and insurrections. Her second husband at one time imprisoned her, only to be himself finally driven from the country. Louis of Anjou sought to deprive Joanna of the throne of Naples, but she called to her aid Alfonso V of Aragon and adopted him. Soon, however, she tired of Alfonso and used the powerful house of Anjou thereafter as a counterpoise to the claims of Aragon. Consult Crivelli, *Della prima e secunda Giovanna, regine di Napoli* (Padua, 1830).

JOANNE, zhô′än′, PAUL BÉNIGNE (1847–). A French geographer, born in Paris. He studied at the lyceums of Saint-Louis and Louis-le-Grand, but after being admitted to the bar he left the law to become assistant and successor to his father, who was editor of the *Guides Joanne* for the Hachette Library. His own greatest achievement is the *Dictionnaire géographique et administratif de la France et de ses colonies* (7 vols., 1889–1905).

JOANNES, jô-ăn′nēz, ISLAND OF. See MARAJÓ.

JOAN (jōn *or* jô-ăn′) **OF ARC** (Fr. *Jeanne d'Arc*), THE MAID OF ORLÉANS (c.1412–31). She was born between 1410 and 1412, in the village of Domremy, near Vaucouleurs, France. She was the daughter of well-to-do peasants and was taught the duties of a girl in her station. When about 13 years of age, she believed that she heard an angel's voice, saying, "I come from God to help thee to live a good and holy life. Be good, Jeannette, and God will aid thee." Gradually "the voices" talked to her more frequently, and she believed them to belong to St. Michael, St. Catharine, and St. Margaret. St. Michael gave to her directions which finally became very definite: "Daughter of God, thou shalt lead the Dauphin to Rheims, that he may there receive worthily his anointing." For four years the "voices" continued to speak to Joan, and the condition of France in the meanwhile became more and more desperate. Henry VI of England had been crowned, at Paris, King of France (1422). The Regent, the Duke of Bedford, was victorious almost everywhere. The Dauphin, Charles VII, weak and vacillating, held little territory and was called in derision, by the English and the Burgundians, "the King of Bourges." Towards the close of 1428 the English laid siege to Orléans, and, although the city was well garrisoned, its defenders finally lost heart and at the beginning of 1429 the place seemed destined soon to be captured. Joan's "voices" had become more distinct and more imperative, until finally she obeyed, and sought the French commander at Vaucouleurs. Her story was at first rejected as that of one insane, but she went a second time and succeeded in getting an escort to Charles VII, to whom she rode in male attire (February, 1429). By his command Joan was admitted to an examination by learned theologians, from which she emerged triumphant. The Dauphin thereupon resolved to employ her. A suit of armor was prepared for her, and she had a white banner made, representing God blessing the fleurs-de-lis. This she herself carried into the front of every battle.

In April preparations were being made to send a convoy with provisions to Orléans. Joan led the troops, and on April 29, 1429, reached the city, still closely besieged by the English. From May 4 to 8 she made successful sallies upon the English, which resulted in their being compelled to raise the siege. Joan was wounded, but not severely. From this time she was known as "the Maid of Orléans." The national ardor of the French was rekindled to the utmost, and Joan became the dread of the previously triumphant English. Between June 12 and 18 the French won notable victories under Joan's leadership. By her own people she was beloved and revered as God's agent; by the English she was believed to be a witch. After some delays she persuaded the Dauphin to allow himself to be conducted to Rheims, where he was crowned (July 17, 1429). From this time her fortune changed, and she failed in several undertakings, notably the capture of Paris. The popular explanation of her failure was that she had broken her sword. It was one which she had miraculously discovered at Fierbois. One day, the story goes, she struck with the flat of this sword some common women whom she found in the camp. The sword broke, and the pieces could not be welded together. Joan took part in many conflicts, until, on May 23, 1430, she succeeded in entering with a few troops into Compiègne, which Burgundian forces were besieging. On the same day, in a sally which she led from the town, she became isolated from her followers and was taken prisoner. Her captors sold her, six months later, to the English. She was taken to Rouen and confined in chains. She was urged to put on female attire, but refused, because she was forbidden by her "voices." Wearing men's clothes and cutting off her hair were two of the main charges against her when she was brought before the Inquisition. She was tried in the ecclesiastical court, as a sorceress, by the Bishop of Beauvais, assisted by members of the University of Paris, which was under English control, and a specially delegated inquisitor. The trial dragged on for months, and Joan faced her judges boldly. One of the judges disguised himself and, pretending to be a fellow-prisoner, won her confidence and secured a great deal of information about "the voices," which was used in the trial. She was threatened with torture to no effect. Finally, on 12 charges which were drawn up by the judges, she was condemned to be burned to death, but she recanted her alleged errors and expressed penitence. Her punishment was then commuted by the ecclesiastical authorities into perpetual imprisonment. The English, however, felt it necessary to have Joan put to death. The events of the next few days are obscure; but it is certain that Joan again put on the male attire which she had abjured. The resumption of these garments and expressions of regret for her recantation were made grounds for concluding that she had relapsed. She was condemned and burned at the stake (May 30, 1431).

After the execution attempts were made to blacken her character in the popular French opinion, but with little success. Her family, by King Charles's influence, obtained in 1450 a revision of her trial, and in 1455 she was formally pronounced to have been innocent.

The memory of the Maid of Orléans during the centuries succeeding the Hundred Years' War never probably enjoyed that general reverence among the French people which her services to her country would seem to have merited. Voltaire's *La Pucelle* expresses the views of the eighteenth-century philosophers regarding the Maid. In the nineteenth century, however, her fame underwent rehabilitation. In 1875 the question of her canonization came up before the Roman Curia, and she was beatified by Pius X, the reigning Pope, April 11, 1909. In literature the character of Joan of Arc has been variously treated. Shakespeare's *Henry VI* reflects the contemporary English opinion, which regarded Joan as a sorceress in league with the devil. In Schiller's beautiful *Jungfrau von Orleans* she is depicted, on the contrary, as a virgin mystic, who, in fulfillment of her heaven-appointed mission, spurns all earthly love and dies in the moment of victory with the banner of the Christ child in her arms.

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JO'ASH, or JEHO'ASH (Heb. *Yehōāsh*). 1. King of Judah, son of Ahaziah (c.836–796 B.C.). On the death of Ahaziah, Athaliah, his mother, massacred all the royal children except Joash, an infant of one year, who was saved by his aunt, Jehosheba, and kept in hiding by her for six years, during which time Athaliah governed the land (2 Kings xi. 1–3). In the seventh year Joash, by the help of Jehoiada, the high priest, was put upon the throne (2 Kings xi. 4–16). Joash reigned 40 years (2 Kings xii. 1). We know but little of his long reign. The most noteworthy event recorded was his conflict with Hazael, King of Syria (2 Kings xii. 18–19). Joash was murdered by his servants (2 Kings xii. 20–21) and was succeeded by his son Amaziah. It has been suggested that the assassination of the King may have been an act of private vengeance for his murder of Zechariah, the son of Jehoiada the priest (2 Chron. xxiv. 21). The references to religious conditions under Joash in Kings and Chronicles, where the King is represented as instituting religious reforms at the beginning of his reign and reverting to "idolatry" subsequently, are believed by some not to rest upon genuine tradition. 2. King of Israel, son and successor of

Jehoahaz (c.797–782 B.C.). He was one of the most warlike kings of the north (2 Kings xiii. 12, 25), and during his reign of 17 years (2 Kings xiii. 1) he brought the Kingdom of Judah to a position of vassalage. His victory over Amaziah was followed by his breaking down of the wall of Jerusalem (2 Kings xiv. 9–14).

JOB (Heb. *Iyyôb*). The hero of the Book of Job, which in the Jewish canon follows the Psalter and Proverbs in the third division of the Old Testament, known as *Kethubhim* or *Hagiographa*. The Book of Job in its present form belongs to that part of ancient Jewish literature which is commonly designated Wisdom Literature, and which, including such books as Proverbs, Ecclesiastes, Ecclesiasticus, and the Wisdom of Solomon, is didactic in purpose and concerned with discussions or considerations of the problems of life. In the Book of Job the problem is the cause of suffering. As a setting for the philosophical discussions on this problem, the following situation is set forth. A pious man by the name of Job, whose home is in the land of Uz and who is blessed with wealth and children, is put to a severe test by God at the instance of Satan, who raises the suspicion that Job's piety is connected with his prosperity. Job is deprived of his possessions and of his children, but remains pious and God-fearing. Satan, not yet satisfied, proposes as a severer test striking Job with a painful and loathsome disease. Job endures in silence and resignation, resisting the temptation suggested by his wife to "curse God" and make an end of his sufferings. Three friends come to visit him—Eliphaz the Temanite, Bildad the Shuhite, and Zophar the Naamathite (chaps. i–ii, containing the prologue). There now begins a series of discourses (iii–xxxi) between Job and his three friends, Job bewailing his sufferings and declaring that he does not merit the punishment heaped upon him, his friends answering in turn and trying to prove, each in his way, that suffering is due to guilt. There are three cycles of speeches and replies. Following Job's lament in chapter iii, the first of these cycles occupies chapters iv–xiv, the second xv–xxi, and the third xxii–xxxi. Chapters xxxii–xxxvii introduce a fourth personage, Elihu, who endeavors to convince Job of his error in questioning the justice of divine government. In xxxviii–xlii. 6 Yahwe Himself is brought in as the speaker, rebuking Job for his presumption in attempting to fathom the secrets of God and demonstrating the limitations of human power. Job in reply confesses his ignorance and his error in giving utterance to words without insight. The book closes (xlii. 7–17) with an epilogue in which the three friends are rebuked by Yahwe; they are ordered to bring an offering of seven bullocks and seven rams in the presence of Job, who is to intercede with Yahwe on their behalf. As for Job, his property is restored to him and increased twofold, and seven sons and three daughters are born to him: he dies happy and full of years.

There are two features of the book that strike one at the first glance: (1) that the story of Job has nothing to do with the religious problem that forms the kernel of the book; (2) that the close of the story, in which Job is justified and rewarded, hardly accords with the light in which he appears in the course of the discussion of the problem. It is probable that chapters i, ii, xlii. 7–17, represent what has survived of a popular story, written in prose, in which a pious man endured severe tests without ever losing his patience or sincere resignation to the divine will. This attitude he apparently maintained throughout in the prose story, in speeches now lost, since Yahwe refers to him (xlii. 7) as having spoken the right thing concerning Him, while the friends so utterly failed to say the right thing that Yahwe is angry with them, and their lives are in danger and can be saved only through Job's intercession. Job is then rewarded for his steadfastness and unswerving piety. The moral was that a just man may suffer as though he were unjust incidentally, as a trial of his loyalty, but that before the end comes he will, if truly righteous, be restored to prosperity and rewarded in addition for the sufferings he has endured. It may be supposed that this folk story fell into the hands of a great poet, who substituted for the speeches of Job and his friends the series of poetic dialogues in which he considers, in a highly artistic and profoundly thoughtful manner, the question whether the suffering that man endures is in all cases due to his own guilt, or, in other words, whether God, the author of everything, acts according to recognized standards of justice. That He does so is the ordinary view of religious people represented by the three friends. Job, acknowledged to be a good and pious man, seems to prove the contrary; and the arguments against the conventional views come therefore with great force from his mouth. Incidentally a second question is raised and by implication answered: Is the popular story correct in assuming that a pious man will endure suffering that he considers unjust in silence and resignation? The discourses of Job in which he curses the day of his birth (iii), declares that his sufferings are out of all proportion to any possible wrongs that he may have committed (vi), takes a most gloomy view of human life (vii), bitterly accuses God of not acting fairly, of not permitting one to plead his case (ix), boldly asserts that he is in the right, and that no one can answer the arguments he presents (xiii), and charges God with persecuting him (xiii. 20–22; xvi; xix. 22)—show that even a truly righteous person, for such Job is assumed to be, may in the agony of his soul cry out in protest against what he deems an undeserved fate. It is particularly noteworthy that the poet puts upon the lips of Job a protest against the kind of apologetics that is nothing but special pleading, partisan advocacy, implying suppression of the truth and affirmation of what is obviously false, in the supposed interest of God (xiii. 7, 8), and a confident assertion that a bold, sincere, and manly scrutiny of the facts is more welcome on high than the hypocrisy that dares not raise its voice except in terms of flattery. The author, indeed, seems to raise the question as to the seat of authority, Eliphaz making his appeal to revelation and inspiration, Bildad to tradition, and Zophar to the majority, while Job appeals to the facts and to his private judgment. Having rejected the theory of the friends that adversity is an unfailing sign of divine anger, provoked by human sin, and prosperity a sign of divine favor, rewarding human righteousness, Job is forced to face the problem of God's nature, a problem which does not exist to the friends, and makes his appeal from a God who may inspire fear, but not respect, to a God in whom power and wisdom wait on justice and love—a great Avenger who will vindicate his character, even though to a mistaken human judgment death may set upon it the final stamp of guilt (xix. 26 ff.). The friends never mention the possibility of a squaring of accounts in a future life; Job refers to this "hope of man" most sympathetically where he pictures himself as waiting on his sentinel's post in the nether world until God should call him back to life, filled with longing for the work of his hands (xiv. 13 ff.), but only to reject it as a fancy and without ever allowing it to influence his argument.

The Book of Job in the new form, it may well be supposed, would have been offensive to religious circles. This appears indeed to have been the case; and, as a consequence, a number of interpolations were made in the speeches of Job, calculated to remove their sting, just as in the Book of Ecclesiastes words and phrases are added here and there which give a different turn to the thought. That the entire book was not rejected was due to the weight attached to the speeches of the three friends. Here were three men noted for their wisdom—friends, moreover, of Job—who all agreed that God was just and that Job was wrong in questioning the divine justice. Three against one represents a powerful majority. Moreover, their arguments seemed forcible. Eliphaz is certainly right in declaring (v) that no mortal is righteous before God; nor can any one gainsay Bildad when he declares (viii) that we are not wiser in penetrating the divine will than our ancestors were; and Job himself declares his acquiescence in Zophar's panegyric on divine wisdom (xi), which is so far superior to human knowledge and power. It might easily seem, therefore, despite the cruel charges brought by the friends against Job that he must have committed some awful crime, that Job's charges against God were not justified, and merited the rebuke they received at the hands of his friends. All, therefore, that was needed to make the Book of Job acceptable and teach just the contrary lesson that God was just and that Job deserved the test, was to take the edge off some of Job's utterances. This was not difficult, for even in the boldest passages of the book the expression is somewhat veiled.

It must not be supposed that the Book of Job as we have it was produced "at one sitting," as it were; it is a growth, and the very popularity which it appears to have enjoyed was a factor in accounting for modifications to which it was submitted. The introduction of Elihu is an illustration of the thesis regarding the gradual formation of the present book. There is no reference to Elihu in the prologue. His speeches are not essential either to the story or to the moral of the book. They are simply a reiteration of the whole problem—the reason and object of suffering, the righteousness of God, the value of faith, and the beneficence of divine government. How and when the speeches of Elihu came to be united with the Book of Job are questions in regard to which scholars have not yet reached general agreement. It is plausible to suppose that the Book of Job found imitators. The problem was attractive, and other writers tried their hand at presenting the arguments in favor of the current religious attitude. The speeches of Elihu impress one in this way as another Book of Job in epitome. Lastly, the speeches of Yahwe (xxxviii–xlii. 6), forming a separate part, while they do not offer a solution of the problem of suffering, still reënforce the attitude of the pious—that man, not having been present at creation and not being admitted into the counsels of the Almighty, dare not and must not question divine justice. These speeches again add nothing to the situation nor to the moral; but they add another witness against Job, and so powerful a one that Job must needs confess his error. The introduction of Yahwe, who severely rebukes Job, contradicts the epilogue in which Yahwe turns with favor to Job and rebukes Job's friends, although the latter have all throughout pleaded Yahwe's cause. The speeches of Yahwe out of the storm are likely to have taken the place of some words of Yahwe in the prose story of a different tenor which the author of our present dialogues did not care to change. That Job's confession of his error is a later addition seems to be evident from xxxi. 40, where it is said, "Here end the words of Job."

The Book of Job in its present form is probably postexilic, and the tendency at present among scholars is to bring the date down towards the third century B.C. One reason for the favor which the book attained in pious circles was the similarity between Job and Israel which naturally suggested itself. Job's sufferings typified Israel's fate. His resignation in the popular story served as an example to the postexilic Jewish community to endure in faith and patience, while the justification of Job by Yahwe Himself is one form of the presentation of the problem, and his restored happiness and prosperity were interpreted as an assurance of the glory that was destined to be again Israel's lot.

Bibliography. Consult the Old Testament introductions, and the commentaries of Ewald, Delitzsch, Dillmann, Duhm, Merx, Hitzig, Davidson, Budde, Siefried, Zöckler; also Budde, *Beiträge zur Kritik des Buches Hiob* (Bonn, 1876). On the text, consult: Bicknell, "Kritische Bearbeitung des Job-Dialogs," in *Wiener Zeitschrift für die Kunde des Morgenlandes* (Vienna, 1892–93); id., *Das Buch Hiob nach Anleitung der Strophik und der Septuaginta* (ib., 1894). On the growth and purport, consult: Renan, *Le livre de Job* (Paris, 1859); Green, *The Argument of the Book of Job Unfolded* (New York, 1873); Fairbairn, "The Problem of Job," in *The City of God* (London, 1886); Cheyne, *Job and Solomon* (ib., 1887); Bradley, *Lectures on the Book of Job* (Oxford, 1887); Meinhold, "Das Problem des Buches Hiob," in *Neue Jahrbücher für deutsche Theologie* (Bonn, 1892); Laue, *Die Composition des Buches Hiob* (1896); Castelli, *Il poema Semitico del Pessimismo* (Milan, 1897); Schmidt, *The Messages of the Poets* (New York, 1911), where an extensive bibliography is also given; Barton, *The Book of Job* (ib., 1912).

JOB, Testament of. A Jewish apocryphal book. It is mentioned in an edict on canonical and spurious books issued by Pope Gelasius I (c.496) as an apocryphon. The Greek text was published by Angelo Mai in his *Scriptorum Veterum Nova Collectio*, vii (Rome, 1833), reëdited by James from a Paris manuscript, in *Apocrypha Anecdota* (Cambridge, 1897), and published again, with an introduction and an English translation by K. Kohler, in *Semitic Studies in Memory of Rev. Dr. Alexander Kohut* (Berlin, 1897). That it is a Jewish midrash, and not a Christian story, is evident from the absence of any distinctive Christian doctrine, and the prohibition "Take not unto yourselves wives from strangers." Kohler thinks that it came from Essene circles, and the conception of immortality is in favor of this assumption. The children of Job were seen, adorned with crowns, standing near the glory of God; the three daughters, when they put on the three-stringed girdles, were transfigured; and He who sat upon the Great Chariot came and took the soul of Job away with a kiss and carried it to the east, where the heavenly throne stood. The book reveals the same kind of traditions concerning Job that are met in the Greek translation and in the Targum on Job. Consult, in addition to the works quoted above, Kohler's article in *The Jewish Encyclopædia*, vol. vii (New York, 1904).

JOBERT DE LAMBALLE, zhō'bâr' de läɴ'bäl', Antoine Joseph (1799–1867). A French surgeon. He was born at Matignon, studied medicine at Paris, and in 1830 became surgeon at the Hospital Saint-Louis. He was elected to the Academy of Medicine in 1840 and to the Academy of Sciences in 1856. Jobert was a brilliant and resourceful operator, best known for his masterly use of *autoplastie*, the repair of diseased parts by healthy neighboring tissue, and especially for the operation which he styled *élitroplastie*, an autoplastic cure of vaginal fistula. He wrote: *Traité théorique et pratique des maladies chirurgicales du canal intestinal* (1829); *Etudes sur le système nerveux* (1838); *Traité de chirurgie plastique* (1849); *De la réunion en chirurgie* (1864).

JOB'S COMFORTER. A popular expression for one who, like Job's friends, while pretending sympathy in times of distress, presents the most hopeless side of the trouble and attributes it to the sufferer's shortcomings. The term is also used of boils, which formed part of Job's afflictions.

JOBSON, jŏb'son, Frederick James (1812–81). A Wesleyan clergyman. He was born at Northwich, Cheshire, became an architect, but in 1834 a minister, and rose to great eminence. His early studies are shown in his *Chapel and School Architecture* (1850), which had considerable influence in improving such structures of his denomination. His travels as a representative of the British Conference produced *America and American Methodism* (1857) and *Australia, with Notes by Way of Egypt, Ceylon, Bombay, and the Holy Land* (1862). Consult his life by Gregory (London, 1884).

JOB'S TEARS, *Coix lachryma-jobi*. An East Indian cereal of stout habit, botanically allied to maize, which sometimes reaches a height of 8 feet. It derives its name from the tearlike form of the hard, shining, bluish-white seeds, which are sometimes made into bracelets, necklaces, and rosaries, and are also used for food in India, where it is somewhat cultivated. It has become naturalized in Spain and Portugal, where flour is occasionally made from it. It is cultivated as a curiosity in the United States and elsewhere. See Chrysolite; Peridot.

JOB'S WIFE, Lamentation of. See Apocrypha, *Old Testament*.

JOCAS'TA. In Greek legend, the mother and wife of Œdipus (q.v.).

JOCELIN DE BRAKELOND, jŏs'lĭn de brăk'lŏnd. An English monk who flourished 1200 A.D. He was trained as a novice under Samson of Tottington, in 1182 became chaplain to Samson, was elected abbot in that year, and was later successively guest master (1196–1200) and almoner (1212). He is characterized as extremely devout. He wrote a chronicle of St. Edmunds Abbey from 1173 to 1202, which was carefully edited by J. G. Rokewood for the Camden Society (London, 1840; new ed., 1905), and of which striking use has been made by Carlyle in *Past and Present* (1843; book ii, "The Ancient Monk").

JOCHMUS, yŏK'mōōs, August Giacomo, Baron de Cotignola (1808–81). A German soldier of fortune and Imperial Minister, born at Hamburg. He was engaged in business, then studied military science in Paris, and in 1827 went to Greece, where he served as adjutant under General Church and in 1832 became Minister of War. But the National party forced him to leave three years afterward. He went to England and from there with the Foreign Legion to Spain; in 1838 he was back in England, and Palmerston sent him to Constantinople to plan the Syrian campaign with Ponsonby. In 1840 he went to Syria, was promoted to division commander in the Turkish army, and was chief of staff in the allied army which captured Acre. After that battle he became commander in chief of the Turkish army of occupation and later Minister of War. He returned to Germany in 1848, and in March of the next year was appointed by the Vicar of Germany, Archduke John, Imperial Minister of the Navy and of Foreign Affairs, a post which he held until December, 1849, when he retired. He was made lieutenant field marshal commanding a division in the Austrian army in 1859, but did no further fighting. In 1870–71 he made a trip around the world. He wrote *Der syrische Krieg und der Verfall des Osmanenreichs seit 1840* (1856). His collected works, edited by Thomas (1883–84), contain his correspondence with Archduke John of Austria.

JOCRISSE, zhō'krēs'. A character in French popular comedy, first seen towards the end of the sixteenth century. He usually represents a stupid countryman and became well known in the eighteenth century through Dorvigny's *Le désespoir de Jocrisse*. The name is popularly used also of a married man too much concerned with domestic matters.

JODELLE, zhō'dĕl', Etienne, Sieur de Lymodin (1532–73). A French dramatic poet, painter, sculptor, engraver, and architect, and member of the Pléiade (q.v.), sometimes called, though with insufficient reason, the founder of French tragedy and comedy—the former by his *Cléopâtre captive* (1552) and *Didon se sacrifiant* (before 1558), the latter by *Eugène*. In a sense these were the first "regular" French dramas, though they were so solely through imitation of Latin dramatists in work that appealed only to scholarly imagination. However industriously imitated, they had no hold on the popular stage, which till the time of Alexandre Hardy (q.v.) was untouched by the scholastic spirit. There is a modern edition of Jodelle's *Works* by Marty-Laveaux (Paris, 1868–70). Consult Faguet, *La tragédie française au XVIème siècle* (Paris. 1883), and Rigal, *De Jodelle à Molière* (ib., 1905).

JODELN, yō'deln (dialectic Ger.). A peculiar manner of singing by using the falsetto voice in harmonic progressions, with sudden and unexpected changes to notes of the chest register. It exists chiefly among the Tyrolese and the Swiss.

JODHPUR, jōd-pōōr', or **MAR'WAR.** The largest of the native Rajputana States, India

(Map: India, B 3). It is bounded on the north by Bikanir and Jaipur, on the east by Ajmere-Merwara and Kishangarh, on the south by Palanpur and Sirohi, and on the west by Sind and the Rann of Cutch. Area, 34,963 square miles. It is traversed by the Luni, which divides the state into unequal portions. The soil is almost entirely sandy and sterile; only the valley of the river and the southeast are fertile, where cotton and wheat are largely grown. Camels, cattle, and sheep are bred. Iron, zinc, and salt are the chief minerals; marble is quarried and woolens are manufactured. Capital, Jodhpur. Pop., 1901, 1,935,565; 1911, 2,057,553.

JODHPUR. The capital of the native Rajputana State of Jodhpur, or Marwar, India, 98 miles west of Ajmere, with which it is connected by rail (Map: India, B 3). It is situated on the south slope of a range of red sandstone hills and is surrounded by a wall 6 miles in circuit and pierced by six gates. It is dominated by an imposing fortress, 400 feet above the plain. Within the massive walls of the fortress are ancient palaces and the Maharajah's treasury. Several magnificent tanks supply it with water by means of pipes; the town also has elaborately constructed and deep wells. Richly carved temples and houses, hospitals, a college, a wheat market, and public gardens adorn its streets. The Darbar High School (occupying the Talati Mal, an old palace), the arts college, a boarding school, and special schools to teach Sanskrit, telegraphy, and surveying, form the chief educational institutions. The palaces of the present Maharajah and his predecessor are on the southeast; the town is electrically lighted. The Jubilee buildings, the public offices of the British Agent, are fine modern buildings in the native style. Jodhpur has well-established institutions and is a flourishing commercial centre. It has manufactures of ivory, lacquer ware, brass and iron utensils, and dyestuffs. The Maha Mandir (great temple), ½ mile to the northeast, occupies a wall-inclosed suburb of 800 houses, to which it gives its name. Jodhpur was founded in 1459, the prior capital having been Mandor, 3 miles north, which has interesting ruins of temples, palaces, and tombs. Pop., 1901, 60,437; 1911, 59,262.

JODL, yŏ′d'l, Friedrich (1849–1914). A German philosopher, born and educated at Munich. He was docent there for five years, professor at Prague in the German university from 1885 to 1896, and then took a chair (1896) in philosophy at Vienna. During his stay in Prague Jodl was prominent in the work of the association for the advancement of things German in Bohemia. In 1890 he became an editor of the *International Journal of Ethics*. He is the master of a remarkably clear style and wrote, besides several monographs on ethical subjects: *Leben und Philosophie David Humes* (1872); *Kulturgeschichtschreibung* (1878); *Geschichte der Ethik in der neueren Philosophie* (vol. i, 1882, 2d ed. 1906; vol. ii, 1889, 2d ed. 1912); *Moral, Religion, und Schule* (1892); *Lehrbuch der Psychologie* (1899; 3d ed., 2 vols., 1908); *Ludwig Feuerbach* (1908).

JODO, jŏ′dō. See Ts'ing-tu.

JO′EL (Heb. *Yŏēl*, Yahwe is God). The son of Pethuel and second (or, according to the order in the Greek version, the fourth) of the twelve Minor Prophets. Concerning the life of Joel absolutely nothing is known, except the fact, gathered from his work, that he prophesied in Judah. The occasion for his prophecy was a destructive plague of locusts, accompanied by a severe drought. The prophecy consists of two parts: (1) (i. 2–ii. 17) A vivid description of the devastation that the plague is causing in the land and a call for repentance, to be manifested by fasting, solemn assemblies, and mourning; this is accompanied by an assurance that repentance will bring forgiveness and renewed prosperity, and will keep off the "day of Yahwe," which, however, is sure to come. (2) (ii. 18–iii. 21) The statement, evidently following repentance on the part of the people, that the plague has departed, and that Yahwe will bless the land with material prosperity and ultimately with a gift of prophecy for all flesh. A description follows of the day when Yahwe will gather the nations together in the valley of Jehoshaphat (q.v.) and judge them for their wrongs against Israel. There are two different problems connected with the book, viz., the meaning of the locusts spoken of and the date of the prophecy. Some critics take the locusts allegorically, as a figure for the enemies of Jerusalem; others take the locusts literally, a plague of locusts being no unusual thing for Palestine. The date must be fixed entirely by internal evidence, and this has produced two widely different views—(*a*) one favoring a preëxilic date, preferably in the days of Joash, (*b*) another in favor of a postexilic date. The main criterion is the list of nations mentioned as enemies of Judah—the Phœnicians, Philistines, Egyptians, and Edomites. The reference to the Greeks (iii. 6) and the fact that there is no mention of the Aramæans, Assyrians, or Chaldæans among the enemies, are potent reasons in favor of the later date, after the return of the exiles, in the days of Ezra and Nehemiah. The trend of opinion is now quite general towards this date.

Joel is full of lofty imagery, and his language is pure and eloquent. The book presents many parallels with other Old Testament books—e.g., Isaiah (cf. Joel i. 15; ii. 10; iii. 10, respectively, with Isa. xiii. 6, 10; ii. 4), Ezekiel (cf. Joel ii. 28; i. 15; ii. 1, 2, respectively, with Ezek. xxxix. 29; xxx. 2, 3), and Amos (cf. Joel iii. 16; iii. 18, respectively, with Amos i. 2; ix. 13). It has been attempted to settle the vexed question of the date by means of these parallels; but naturally there is great difference of opinion as to which prophet is borrowing. Consult: Credner, *Der Prophet Joel übersetzt und erklärt* (Halle, 1831); Wünsche, *Die Weissagung des Propheten Joel übersetzt und erklärt* (Leipzig, 1872); Merx, *Die Prophezeiung des Joel und ihre Ausleger* (Halle, 1879); and the authorities referred to under Minor Prophets.

JOE MILLER'S JESTS. See Miller, Joseph.

JOE′-PYE′ WEED. A North American medicinal plant. See Eupatorium.

JOFFRE, zhŏ′fr', Joseph Jacques Césaire (1852–). A French general, born in Rivesaltes, Pyrénées. In 1868 he entered the Ecole Polytechnique to study military engineering. He entered active service in September, 1870, in an artillery battery in the Franco-Prussian War, after which he returned to the Polytechnique. He became a captain in 1874 and helped plan the defenses of Pontarlier. In 1883–84 he fought under Courbet in Tongking, and in 1893 under Dodds in Dahomey. He was prominent in the French occupation of Timbuktu in 1894 and in the fortification of Diego Suarez in Madagascar in 1897. After his return to France he was a professor in the Higher War School for a time and was promoted brigadier general of a division. In July, 1911, while he was commanding the Second Army Corps at Amiens, he was appointed chief of the general staff. The three years' military service law for the French army was largely due to Joffre's efforts. For his services in the earlier part of the European War President Poincaré conferred on him a military medal in November, 1914. The article War in Europe contains a discussion of his work as head of the French army.

JOGGS. See Jougs.

JOGUES, zhôg, Isaac (1607–46). A Jesuit missionary to the North American Indians, born in France. He joined the Society of Jesus in 1624 and in 1636 was ordained and sent to the Huron mission, then the most dangerous of all which the society maintained in the New World. There he labored until 1639, when he was chosen for the new and even more perilous mission among the Tobacco Nation. Two years later he made the long and arduous journey to Sault Ste. Marie, where he preached to an assemblage of 2000 Algonquins, and soon after his return he set out for Three Rivers to procure supplies for the Huron mission. As he was crossing the Lake of St. Peter on his return, he and his companion, Goupil, were captured by the Iroquois. The prisoners were taken to the Mohawk villages and fearfully tortured. Goupil was finally killed, but Jogues was kept as a slave. His pitiable condition excited the compassion of Dominie Megapolensis and other Dutchmen at Rensselaerswyck, who finally succeeded in smuggling him aboard a vessel, which conveyed him down to New Amsterdam, where Director General Kieft received him kindly and sent him to France. The story of his sufferings had preceded him, and on his arrival he was received as a hero; even the Queen showed him marked attention, and the Pope gave him a special dispensation which enabled him to say mass despite the mutilated condition of his hands. He soon returned to Canada, however, and two years afterward again went to the Mohawk villages; but this time as an ambassador from the Canadian government and as the founder of a new mission, the Mission of the Martyrs. Having accomplished his political object, which was to confirm the Mohawks in their adhesion to a recently signed treaty of peace, he returned to Quebec, but went back once more to work among the Mohawks. There having been a change in the feelings of the Indians, he was soon subjected to torture, and finally one night as he entered a lodge to which he had been invited for a feast a savage sprang from the darkness and struck him dead. The place of his martyrdom, Ossernenon, near Auriesville, N. Y., has become a place of pilgrimage to Roman Catholics. Consult: Francis Parkman, *The Jesuits in North America* (Boston, 1864; new ed., 1898); Camille de Rochemonteix, *Les jesuites et la nouvelle France* (Paris, 1895); R. G. Thwaites (ed., *The Jesuit Relations* (73 vols., Cleveland, 1896–1901); Martin, *Father Isaac Jogues*, translated by Shea (New York, 1896).

JOHAN′NA. One of the Comoro Islands (q.v.).

JOHANNESBURG, yô-hän′nes-bûrg. The largest and most advanced city in South Africa, situated in the Transvaal Province, at an altitude of 5735 feet, in the midst of the gold district, 35 miles south of Pretoria (Map: Africa, G 7). It is connected with Pretoria, Delagoa Bay, Cape Town, and Port Elizabeth by rail, and is a modern city, intersected by parks and broad thoroughfares, lined with fine buildings, including theatres, clubs, and a stock exchange; it is electrically lighted. In 1906 the installation of electric street railways was begun, and, by 1913, 63 miles of track had been laid. It has the Transvaal University College (founded in 1903), a good art gallery, a library of 32,000 volumes, and an observatory. An imposing fortress erected by the Boers, but now dismantled, commands the town. Johannesburg was founded in 1886 and grew rapidly, owing to its location on the Witwatersrand gold fields, one of the richest gold-mining districts in South Africa. It was the seat of the Uitlander disaffection which led to the war with Great Britain (1899–1902). Pop., 1896, 99,800 (including 8000 Boers, 43,000 natives, and 34,000 British); 1904, 158,580 (83,902 whites, 62,524 natives, and 12,154 other colored); 1911, 237,104 (Europeans, 119,953; natives, 117,151). Johannesburg was captured, without opposition, by the British under Lord Roberts on May 29, 1900. A notable feature in the neighborhood is the national Boer monument commemorating the declaration of independence in 1880, which stands on the open veldt near the suburb of Krugersdorp.

JOHANNES CLERICUS. See Le Clerc, Jean.

JOHANNESEN, yô-hän′ne-sen, Edvard Holm (1844–1901). A Norwegian Arctic navigator and hunter, born in Balsfjorden. His successful ice navigation of Barents and Kara seas in 1869 gained for him a medal from the Swedish Academy of Sciences. In 1870 he circumnavigated Nova Zembla, the first so to do. In 1878, rounding Nova Zembla to the north, he discovered and circumnavigated in Kara Sea, in 77° 31′ N., 86° E., Ensomheden (Einsamkeit or Lonely) Island, snow free and a resort of sea game. In 1887 he discovered to the east of Northeast Land a high, snow-covered island in 80° 10′ N., 30° 32′ E., called New Iceland, possibly the same as White Island. These discoveries brought him the gold medal of the Swedish Academy of Sciences.

JOHANNES SECUNDUS, jô-hän′nēz sê-kŭn′dŭs (1511–36). A Latin poet, born at The Hague. His true name was Jan Nicolai Everaerts. He studied law at Bourges, but early devoted himself to the fine arts, but more especially to poetry. He traveled in Italy and Spain, became secretary to Cardinal Tavera, Archbishop of Toledo, and accompanied Charles V on his expedition to Tunis. His poems are admired for their classical purity, delicate sentiment, and graceful imagery, and have been translated into several foreign languages. The best known among them are the *Basia* (1539). A complete edition of his *Opera Poetica* was published by his brothers in 1541.

JOHANNES VAN DEWALL, yô-hän′nȧs văn dä′vȧl. The pseudonym of the German novelist August Kühne (q.v.).

JOHANNOT, zhô′ȧ′nô′, Charles (1793–1825), Alfred (1800–37), Tony (1803–52). Three brothers, all engravers, the younger two also historical painters, born in Germany of French parents—Charles at Frankfort, Alfred and Tony at Offenbach. Their father, François, was a silk manufacturer in Offenbach until 1806, when financial reverses obliged him to emigrate.

He was also a painter of flowers and is said to have been the first to print music from stone, introducing the art of lithography into France. Charles engraved illustrations, after Desenne, for Tasso's *Aminta* and Voltaire's *Paul et Virginie.* Alfred learned engraving from his brother Charles, and collaborated with his brother Tony in illustrations for the French translation of the works of Byron, Cooper, and Scott. Many engravings by Alfred and Tony are signed *Johannot frères.* Alfred exhibited with great success at the Salon and was decorated by the King. Three of his paintings are at Versailles. Tony was a vignettist of the first order, and his illustrations rank with the best of the eighteenth century. He is credited with more than 3000 engravings, besides illustrations for over 500 books and pamphlets. He exhibited at the Salon regularly after 1831, was decorated in 1840, and two of his paintings are at Versailles.

JOHANNSDORF, yō'hâns-dôrf, **Albrecht von.** A German minnesinger from Bavaria, who flourished between 1185 and 1209 and probably took part in the Crusade of 1190. His love songs are full of natural feeling, mingled with a current of religious enthusiasm. Consult Lachmann and Haupt, *Des Minnesangs Frühling* (Leipzig, 1888), and Bartsch, *Liederdichter*, xxxv.

JOHAN'SEN, Jean McLane (1878–). An American portrait painter, wife of John C. Johansen. She was born in Chicago and studied at the Chicago Art Institute and under Duveneck and Chase in New York. Her art is unaffected in conception and bold in treatment. Her first picture to attract attention was a "Girl in Gray," now in the Art Museum of Toledo. Among other noteworthy works are: "On a Hill Top" (Salon, 1908); "Mother and Babe" (1911); "Girl in Green" (1912); the portrait of Mrs. Henry Hammond and daughter, awarded the Shaw prize, National Academy of Design, in 1912; "Brother and Sister" (1913). She won the Elling prize in 1906 and the Burgess prize in 1907 (both awarded by the New York Art Club), and first prize at the International Art League of Paris in 1907. She was elected an associate of the National Academy of Design.

JOHANSEN, John Christen (1876–). An American portrait, figure, and landscape painter. He was born in Copenhagen, Denmark, was brought to America in infancy, and studied at the Art Institute, Chicago, then under Duveneck, and also in Paris under Constant Laurens and Whistler. In 1901 he removed to Chicago, but returned in 1906 to spend several years in France and Italy. A master of technique and possessor of a strong romantic individuality, he is especially clever in working out novel problems of color and in handling light. His portraits are sincerely fresh and personal renderings; among his sitters are many persons prominent in the academic, scientific, and social worlds. His architectural views of Venice, exhibitions of which have been held in London and New York, have achieved especial success on account of the novelty of color scheme and treatment. Among his best-known paintings are: "October, Sear and Gold," purchased by the Chicago Municipal Art League in 1903; "Piazza San Marco," Art Institute, Chicago; "Fiesole," Richmond Gallery; portraits of Professors Daniels and McLaughlin and "Sunrise in Venice" (1911); portrait of J. H. Kehler (1911); "In the Sewing Room" and "Approaching Storm" (1912). He received the Young prize at Chicago in 1903, a gold medal at Buenos Aires in 1910, and the Saltus gold medal, National Academy of Design, in 1911. He became an associate of the National Academy and made his residence in New York. He married Jean McLane. (See Johansen, Jean McLane.)

JOHANSSON, yô-hàns'sôn, **Karl Ferdinand** (1860–). A Swedish philologist, born at Misterhult and educated at Upsala, where he became docent and afterward professor of Sanskrit and of comparative philology (1893). Besides some 70 articles in *Bezzenbergers Beiträge, Kuhns Zeitschrift, Indogermanische Forschungen, Nordisk Tidskrift for Filologi*, etc., contributed to those journals especially after 1900, he wrote: *De Derivatis Verbis Contractis Linguæ Græcæ Quæstiones* (1886); *Några ord om dialekter, Specielt de Grekiska* (1888); *Beiträge zur griechischen Sprachkunde* (1890); *Indiska sagor, översatta från sydbuddhistiska originaltexter* (1907). In 1906 he became coeditor of *Le Monde Oriental.*

JOHN, the Apostle. One of the Twelve Apostles, commonly believed to have been the "beloved disciple" and the author of the New Testament books known as the Gospel of John, the three Epistles of John, and the Revelation. This traditional view is involved almost necessarily with the supposition that the Apostle John lived to a great age, that the last period of his life was spent in Asia Minor, and that the New Testament books written by him were all the product of his later years. As nearly every point of the traditional view is now disputed by many of the foremost New Testament scholars, it will be necessary to review the ancient evidence regarding the life of the Apostle John and try to ascertain its actual significance and value.

1. *The Earliest Evidence, that of the Synoptic Gospels, the Acts, and the Pauline Epistles, all well within the Limits of the First Century A.D.* The first notice of John in the Synoptic Gospels is in Mark i. 19–20 = Matt. iv. 21–22. Here we find that early in Jesus' ministry John, with his brother James and his father Zebedee, was engaged in the fishing business on the Sea of Galilee. They had boats, nets, and hired servants. Jesus, passing by, summoned the two brothers to leave their occupation and follow him. They obeyed and along with another pair of brothers, Peter and Andrew, similarly summoned, they constituted the first group of followers or disciples of Jesus (cf. Mark i. 29). Luke's account of the same incident (Luke v. 1–11) differs somewhat from that in Mark and Matthew, though agreeing as to the main points noted above, while adding the statement that Peter was in partnership with James and John. Later, when Jesus selected 12 of his followers to be more closely and permanently associated with him, John with his brother James was one of the 12 who were later known as the Apostles (Mark iii. 14 ff. = Luke vi. 13 ff.; cf. Matt. x. 2–4). In all three lists the four names of the two pairs of brothers stand at the head. At the raising of Jairus's daughter Peter, James, and John were the only disciples Jesus allowed to enter the house with him (Mark v. 37 = Luke viii. 51). Similarly these three alone were privileged to witness the transfiguration scene (Mark ix. 2 ff. = Matt. xvii. 1 ff. = Luke ix. 28 ff.). On one occasion John (probably in conjunction with his fellow disciples), seeing a certain one casting out demons in Jesus' name,

although not one of Jesus' disciples, forbade him to do so, as he was not a disciple. For this he was rebuked by Jesus (Mark ix. 38–41 = Luke ix. 49–50). It may be that this zeal for his Master and the incisive, uncompromising disposition it evidenced, in which his brother shared, led Jesus to give them the surname Boanerges (sons of thunder, Mark iii. 17). The same trait of character is disclosed in the incident, related only by Luke (ix. 51–56), when James and John wished to call down fire from heaven on the inhospitable Samaritans. On this occasion also Jesus rebuked them. As Jesus and his disciples were drawing near the city of Jerusalem on his last journey thither, James and John, apparently through their mother, made the request that in the coming Kingdom they might have the seats of honor at his right and left hand. The answer of Jesus indicated to them that their devotion to him would involve suffering and death similar to his own, but contained no promise of special honors (Mark x. 35 ff. = Matt. xx. 20 ff.). According to Mark (xiii. 3), it was to the four—Peter, Andrew, James, and John—that Jesus privately made known the course of future events. According to Luke (xxii. 8), Peter and John were the ones to whom Jesus intrusted the preparations for the Last Supper, and on these two with James the brother of John he leaned for comfort and sympathy in his hour of trial and agony in Gethsemane (Mark xiv. 33 = Matt. xxvi. 37).

The impression produced by the Synoptic narrative is that John was a Galilean, of a family possessed of at least moderate means. As Galilee was largely a bilingual country, it is easily credible that John could speak and possibly write Greek, though his mother tongue was Aramaic. When a boy, he might have learned Hebrew in the synagogue school. He gave a whole-hearted response to Jesus' summons and with his brother James and his friends Peter and Andrew soon belonged to the circle of followers with whom Jesus was most intimate.

In the record of the very early years of the Church as given in Acts, John holds a prominent place, as the Synoptic record would lead us to expect. He is usually associated with Peter, who seems to have been the chief speaker, and no word of John's is recorded (Acts i. 13; iii. 1, 3, 4, 11; iv. 1–32; viii. 14 ff.). The last notice of John in Acts does not necessarily refer to a date later than about 35 or 36 A.D., about the time of the persecution that followed the martyrdom of Stephen, when many of the Christians fled from Jerusalem. His brother James was put to death by Herod, certainly not later than 44 A.D. (Acts xii. 2). That John was in Jerusalem after this, and considered one of the three "pillars" of the Palestinian church, is practically certain from Paul's account of the Council in Jerusalem (c.49 A.D.), at which John, Peter, and James (the Lord's brother) gave formal sanction to Paul's apostolic status (Gal. ii. 1–10, the only reference to John in Paul's letters). All this, our earliest and most undisputed information regarding John, carries us no farther than c.50 A.D., but may be said fairly to imply that he was one of the three or four most prominent Apostles and to prepare us for other traditional information to the same effect.

2. *The Tradition Concerning a John in Asia Minor.* We may begin with the Book of Revelation. This book claims to have been written by some one named John (Rev. i. 1, 4, 9; xxii. 8). Assuming that the work is a unity and is not pseudonymous, questions that do not concern us here, it is certain that the book witnesses to the fact or tradition that a certain John was a man of the greatest influence in the Christian communities of the Province of Asia in early times. As the date of Revelation cannot be placed later than c.90 or 95 A.D. (it may have been earlier), it makes certain that before the end of the first century A.D. a John was a prominent figure in the Christian circles of Asia. Who was this John? Justin Martyr, who was converted c.130 A.D. in Ephesus, believed that the author was John the Apostle (*Dial.*, 81). All early Christian tradition after Justin is practically unanimous on this point. By writers near the end of the second century a number of interesting details are supplied regarding the Apostle's stay in Ephesus—that once he refused to remain in the same bath with the heretic Cerinthus, and that he lived until the times of Trajan (from Irenæus); that his grave was at Ephesus (from Polycrates); of his wonderful success in reclaiming a young convert from a brigand's life (from Clement of Alexandria); to say nothing of the countless miracles attributed to him in the apocryphal *Acts of John* written between 130 and 180 A.D.

But when we go back earlier than Justin Martyr the evidence becomes more uncertain. The two most important Asia Minor witnesses are Polycarp of Smyrna and Papias of Hierapolis, both of whom lived in the first half of the second century A.D. Irenæus, who heard Polycarp in his early youth, says that he distinctly remembered how Polycarp used to tell of his intercourse with John and others who had seen the Lord (*Ep. ad Flor.*). Papias, however, in the fragments of his work that remain, does not say that he had heard or seen John the Apostle, but does speak of a John "the Elder," who was apparently a prominent Christian, who had seen the Lord and from whom Papias had learned, directly or indirectly, certain things Jesus had said.

These testimonies, it will be observed, cease to be clear and convincing just at the important point, and perplexities now begin. For Papias not only seems to speak of John "the Elder," although early writers who had read his entire work supposed he meant thereby John the Apostle, but in a fragment of his work that has recently come to light says that not only James but his brother John also was slain by the Jews, presumably in Palestine and before the fall of Jerusalem (70 A.D.). If this was so, then the John of Asia Minor who wrote the Revelation must have been some other John than the Apostle, and the known facts of the Apostle's life would be confined to those noted above under section 1. In this case, also, we might assume that a certain John, possibly a disciple of Jesus, found his way in the later years of the first century to Ephesus and there became an influential teacher and was the author of the New Testament books assigned to "John" or "the Elder" (2 and 3 John). In the course of time tradition confused him with the Apostle. Such is the general view, with variations in detail, now favored by many leading scholars.

Its acceptance, however, presents serious difficulties: as (1) the difficulty of explaining how the confusion of persons could have taken place in the very region where the supposed "Elder" was so well known; (2) the fragments of Papias are not free from suspicion both as to genuineness and exact meaning; (3) the witness of Irenæus as to what Polycarp said, being personal testimony as to what he himself heard Polycarp say, is not to be easily cast aside.

3. *The Fourth Gospel and the Apostle John.* Whether the Fourth Gospel can tell us anything of the Apostle John depends upon what is the true answer to the question raised in section 2 above. If the tradition as we know it from c.130 on is true, the Fourth Gospel is the work of John the Apostle, and, in addition to its own testimony to the literary powers and activity of John in his later years, it adds many details as to his experiences with Jesus to the account given in the Synoptics. For, on this view, there can be little doubt that the unnamed disciple "whom Jesus loved," about whom so much is said, was John himself. But if John was martyred by the Jews before 70 A.D., the Fourth Gospel and the Epistles were by some other author and tell us nothing certain of John the Apostle.

Bibliography. The ablest presentation of the traditional view will perhaps be found in James Drummond, *The Character and Authorship of the Fourth Gospel* (London, 1903); V. H. Stanton, *The Gospels as Historical Documents* (Cambridge, 1903); William Sanday, *The Criticism of the Fourth Gospel* (New York, 1905); Theodor Zahn, *Introduction to the New Testament* (Edinburgh, 1909). The case for the opposing view is ably presented by B. W. Bacon, *The Fourth Gospel in Research and Debate* (New York, 1910), and J. Moffatt, *Introduction to the Literature of the New Testament* (ib., 1911).

JOHN THE BAPTIST. The forerunner of Jesus Christ. The sources on which we depend for our knowledge of the man and his work are: 1. The sections of the Gospels especially devoted to a description of him and his ministry. Of these the accounts in the Synoptic Gospels relate chiefly to his career up to the baptism of Jesus, while the account of the Fourth Gospel is concerned mainly with John's relation to Jesus after the baptism of the latter. 2. The incidental notices of the Baptist in the Gospels, either by the Evangelists themselves or in their reports of Jesus' words. 3. The account of Josephus (*Ant.*, xviii, 5, 2). From these various sources we learn that John the Baptist was born about six months before Jesus, in a town in the hill country of Judæa. The name of the town is not given. The parents were of priestly stock and full of anxious thought and earnest expectation concerning the future of Israel. To this only child, born in their old age and looked upon as a gift of Jehovah, they gave the name John (Hebrew *Johanan*, 'Jehovah is gracious'). Naturally he was well instructed in the religious literature of Israel. To what extent, if at all, he was initiated into the priestly life we are not told. It is noteworthy that the messengers sent to him by the Jerusalem authorities were certain priests and Levites, as though these were best fitted to examine him (John i. 19). The greater part of his early manhood was spent in retirement, in the quiet of the wilderness. But at last, as in the case of the prophets of old, the "word of the Lord" (Luke iii. 2) came to him, and he issued from his retirement with a message such as Israel had not heard for centuries. (For the date, see NEW TESTAMENT CHRONOLOGY.) The scene of his first public appearance was in the lower Jordan valley and the wild slopes of northeastern Judæa (Matt. iii. 1; Mark i. 4; Luke iii. 3). Here, clad in homely garb, eating the simplest diet, he began his public ministry, crying, "Prepare ye the way of the Lord" (Mark i. 2). Hearers soon began to throng about him, the whole country was agitated, and even from Galilee the crowds gathered to hear the great preacher.

The message of the preacher was not a honeyed one. Like the prophets of old, his summons was "Repent!" Righteousness was the one thing needful. For it was a time of crisis; the axe was already laid to the tree; the chaff of the threshing floor was about to be burned; "the day of Jehovah," foretold by the prophets, was at hand (Matt. iii. 2, 7, 10; Mark i. 4; Luke iii. 3, 7–9). Nothing but a thorough repentance, a new moral condition, could save Israel from doom. What made this message so startling was its stern application to Israel, the chosen people. The Messianic age was not painted in glowing colors, as a glorious triumph of Israel over her enemies. No false trust in the boasted descent from Abraham was permitted to blind the eyes or dull the conscience. The Messianic age was to be ushered in by judgment, a judgment that was to sift Israel herself first of all. Only a new, purified, righteous Israel could hope to meet and greet that age with confidence. This coming dispensation held a large place in John's thought. To the many inquiries as to who he claimed to be, his reply was: "I am only the herald, only the voice that prepares the way; the greater one is to follow; one for whom I am unworthy even to do a slave's service" (Matt. iii. 11, 12; Mark i. 7; Luke iii. 15–18). And it was doubtless with reference to this impending age that John instituted the rite of baptism. As a symbol, it was somewhat common in Jewish circles. Ceremonial lustrations with water were frequently practiced. But John's baptism was no ordinary lustration. The requisite to receiving it was a confession of sin, and the baptized one arose from the water, as a member of the new Israel, repentant, and thus ready to meet the Messianic age, which to such would be an age of blessing, not of judgment.

The multitudes that came to hear the Baptist were of two opinions. Some refused to admit the reality of his mission and would have nothing to do with his baptism. Of such a mind were the higher classes. The humbler classes, on the other hand, welcomed him as a true prophet; and many of them, even those most despised and sinful, took his message to heart and were baptized (Luke vii. 29, 30; Matt. xxi. 32). For months, possibly a year, John continued his work—not always in the same place, but never far from the Jordan. He organized a body of disciples and prescribed for them certain regulations touching prayer and fasting (Matt. xi. 2; Luke v. 33, xi. 1; Mark ii. 18 ff., vi. 29). In the course of his ministry—under what circumstances it is not stated—he rebuked Herod Antipas, Tetrarch of Galilee and Peræa, for his adulterous marriage with Herodias, the wife of his brother Philip. This seems to have aroused Herodias, rather than Herod, to anger; for Herod's imprisonment of John which followed was not so much a personal revenge upon his boldness; it was really because Herod feared John's growing influence with the people; in fact, it is not at all impossible that he wished by this imprisonment to save him from the murderous hostility of Herodias, which, if it were realized, he felt might rouse the people in revolt against him. During his captivity, therefore, his disciples had free access to him, and Herod even delighted to hear his teachings (Mark vi. 14–20; Matt. xiv. 1–5). Finally, however, in the drunken revelry of a birthday feast Herod was trapped by Herodias into ordering his execution, and he was beheaded at the castle of Machærus (Mark vi. 21–29; Matt. xiv. 6–12; cf. the account of Josephus). It seems likely that John's disciples continued their organization for some time afterward. In fact, 20 or more years later followers of the Baptist were found in Alexandria and in Ephesus who had been baptized according to John's rite, but had not seemed to appreciate the presence of the spiritual age for which it was intended to prepare (Acts xviii. 24–xix. 7). In other words, they had been baptized simply in reference to repentance from sin, but not with the emphasis on the Messianic era as already ushered in and partly realized in the Messianic work of Jesus (cf. Acts i. 5; xi. 16). Such a following, existing apart from the Christian communities, may have arisen from that spirit of aloofness from Jesus' work which seems to have developed in the latter part of the Baptist's life, and which afterward may have been emphasized by his disciples into a claim of Messiahship for him (cf. Luke iii. 15; also 1 John v. 6). This following seems to have resolved itself into several definitely heretical sects, some of which persisted into the latter part of the second century.

As to the relation of John to Jesus, it is not likely that there was any intimate acquaintance between them before their public work began (John i. 31), though their mothers were related (Luke i. 36). But the report of the great excitement in the lower Jordan valley reached Nazareth, and in due time among those presenting themselves for baptism was Jesus of Nazareth. The message of John had summoned him to the establishment of this new age as the work which, in the consciousness of his unique relations to God, he realized was the work he was intended to do; for to Jesus this rite was as really a symbol of his moral attitude of consecration to his work as it was to the people a symbol of their moral attitude of repentance in preparation for this work. In its administration both John and Jesus were fulfilling its expression of their right relations to this Messianic work which was to be accomplished. The Baptist discerned that there stood before him no ordinary person, and he was unwilling to baptize the candidate, but yielded at Jesus' reasoning that "so it becometh us to fulfill all righteousness" (Matt. iii. 14, 15). Most likely only John and Jesus were conscious of the confirmation of Jesus' consecration to his work which followed in the special endowment of Jesus with the Spirit of his work and in the divine acknowledgment of his act through the voice from heaven (Mark i. 10, 11; Matt. iii. 16, 17; Luke iii. 21, 22; cf. John i. 32–34). Though thus ushered into his public ministry by John, Jesus seems to have had little converse with him subsequently (yet cf. John iii. 26). Nevertheless, Jesus ever recognized the greatness of John's work and character. In his opinion John was no "reed shaken with the wind," but a prophet, the last in the great succession. He was the greatest of mortals (Matt. xi. 7–15; Luke vii. 24–28, xvi. 16). He came in "the way of righteousness" (Matt. xxi. 32), and the result of his work was that many were seeking to enter into the kingdom of heaven as by force. His witness was a witness to the truth, for he was a "burning and shining light" (John v. 33–35). More than all this, he was the one definitely predicted in Mal. iii. 1 as the Elijah who was to come (Mark ix. 13; Matt. xvii. 12). These statements show conclusively that Jesus recognized in John his forerunner, whose duty it was to prepare for his greater ministry. Such preparation was accomplished in two ways. On the one hand, the general awakening of the moral sense of Israel by the Baptist's preaching made Jesus' profounder and higher message more readily and easily apprehended. On the other hand, the definite designation of Jesus as the one who was to come, to a few choice spirits among his followers, led these to Jesus as the first and truest of his disciples (John i. 29 ff.). Notwithstanding, however, Jesus' testimony to John's greatness and recognition of him as his forerunner, he taught that John's conception of his mission was not altogether adequate. The "least in the kingdom"—i.e., the humblest one of those who entered the kingdom along the lines of Jesus' message of the Heavenly Father and His love—was on a higher plane than John the Baptist (Matt. xi. 11; Luke vii. 28). John's prophetic gift and calling did not make him infallible. His view of the Messianic age saw it mainly as one of judgment, sifting, and punishment. Jesus, with just as great an insistence on righteousness, proclaimed it in a gospel of glad tidings as an epoch of release from bondage, an era of comfort to the weary, a welcome to the Father's house. To John the judgment was in the foreground; to Jesus forgiveness was in the foreground, and forgiveness through the service he was to render for its realization. John did not advance beyond the old idea of repentance in order to the escape of judgment; Jesus called for repentance, but in order to a personal relation to himself (Matt. ix. 11–17; Mark ii. 21, 22). With this emphasis upon the judgment character of the coming age, John looked upon Jesus as one who would assert it in the spirit of a Judge. He could not appreciate Jesus as the suffering Servant of the prophets (Isa. liii). He was so thoroughly conscious of his own relations of servitude to Jesus that he could not understand the elements of self-sacrificing service in the ministry which Jesus was carrying out. And so he sent to him his message of confused inquiry, "Art thou he that cometh, or look we for another?" (Matt. xi. 3). It was in the hope that nevertheless the spiritual discernment of John would discover the spirit of his mission that Jesus sent back his messengers with his reply to their master in prison (Matt. xi. 4–6). John, however, most likely carried his confusion with him to his death, and his disciple following confirmed it in the separate organization which they continued to maintain. Consult the various lives of Christ, and H. Köhler, *Johannes der Täufer* (Halle, 1884); H. R. Reynolds, *John the Baptist* (London, 1888); James Stalker, *Two St. Johns of the New Testament* (ib., 1905); A. T. Robertson, *John the Loyal: Studies in the Ministry of the Baptist* (New York, 1911); Blakiston, *John Baptist and his Relations to Jesus* (London, 1912).

JOHN. The name of 23 popes.—JOHN I (Pope, 523–526), a native of Tuscany. Nothing is known of his pontificate except his heading an embassy to the Emperor Justin II at Constantinople, at the request of Theodoric, the Arian King of Italy, in regard to the execution of an Imperial edict against the Arians. On his return he was imprisoned by Theodoric, who was dissatisfied with the result of his mission, and died in captivity. His day is May 27.—John II (Pope, 532–535), a Roman, Mercurius by name. He appealed to Athalaric, King of the Goths, for aid in putting down simony, which was fearfully prevalent. His letters are in Migne, *Patrologia Latina*, vol. lxvi.—John III (Pope, 560–573).—John IV (Pope, 640–642), a Dalmatian by birth. He condemned the Monothelites and insisted that Honorius I had not sanctioned their doctrine.—John V (Pope, 685–686), a Syrian, the first of several popes of Eastern birth, who owed their election to the influence of the exarchs. He had been sent by Pope Agatho as his legate to the sixth general council.—John VI (Pope, 701–705), a Greek. He decided the prolonged conflict between St. Wilfrid of York and the see of Canterbury in the former's favor. His letters are in Migne, *Patrologia Latina*, vol. lxxxix (Paris, 1844–64).—John VII (Pope, 705–707), a Greek, the immediate successor of the preceding. He is said to have persuaded the Anglo-Saxon clergy to abandon their secular dress. Consult, for John IV, V, VI, VII, H. K. Mann, *Lives of the Popes* (London, 1902–06).—John VIII (Pope, 872–882), a Roman by birth and Archdeacon of Rome before his elevation. He supported the claim of Charles the Bald to the Empire and crowned him in 875; two years later he upheld his disputed right in a great synod at Ravenna. The incursions of the Saracens in Lower Italy gave him much trouble, and after strenuously opposing any compromise with them he was obliged to purchase exemption from their attacks by a yearly tribute. He made a determined attempt to reunite the Eastern church with Rome, but was defeated by the crafty stubbornness of Photius (q.v.). His numerous letters are in Migne, *Patrologia Latina*, vol. cxxvi (Paris, 1844–64). Consult, for the Eastern negotiations, Hergenröther, *Photius, Patriarch von Constantinopel* (Regensburg, 1867).

John IX (Pope, 898–900), a Benedictine, the candidate of the Frankish party. His position amid the troubles of the time was very insecure, and, though a zealous man, he accomplished little except the rehabilitation of his predecessor Formosus.—John X (Pope, 914–928), a native of Romagna. He became Archbishop of Ravenna in 905 and was raised to the papacy by the influence of Theodora's faction. But he disappointed their expectations by striving to render his temporal power independent of any party. He defeated the Saracens in person and attempted a reconciliation with the Eastern church. He was imprisoned, and perhaps murdered by Marozia, daughter of Theodora, whose ambitions he opposed. His letters are in Migne, *Patrologia Latina*, vol. cxxxii (Paris, 1844–64).—John XI (Pope, 931–936), the son of Marozia by her first husband, Alberic. She and her other son, Alberic II, practically ruled, leaving none but purely sacerdotal functions to the Pope.—John XII (Pope, 955–964), the son of Alberic II, elected at the age of 18. His name was Octavian; he was the first to introduce the practice of adopting a new name. He gained the support of Otho I, whom he crowned Emperor in 962, but fell out with him afterward and, in consequence of many grievous accusations, was threatened with deposition. He conquered his opponents, but died soon afterward.—John XIII (Pope, 965–972). He was Bishop of Narni before his choice as the candidate of Otho I for the papacy. By his influence with the Emperor John recovered Ravenna and the rest of the *patrimonium Petri*. He crowned Otho's young son as associate in the Empire and aided in procuring for him the hand of the Greek Princess Theophano. His letters are in Migne, *Patrologia Latina*, vol. cxxxv (Paris, 1844–64).—John XIV (Pope, 983–984), previously Bishop of Pavia and Chancellor of Otho II. When the Emperor died and his wife, Theophano, left Rome, John was helpless. Boniface VII, who had seized the papacy on the death of Otho I and had then fled to Constantinople in fear of the counts of Tusculum, now returned and imprisoned him in the castle of Sant' Angelo, where he was done to death four months later. Consult Floss, *Die Papstwahl unter den Ottonen* (Freiburg, 1858). Another John is included in some lists of the popes as the immediate successor of Boniface, but according to modern investigations he has no claim to the title. His inclusion has introduced a confusion into the numbering of the later Johns.

John XV (Pope, 985–996), elevated by Crescentius and his party, and completely under their influence. After his death, Otho III caused the election of his own kinsman Bruno, as Gregory V, but on the Emperor's departure he was driven out by Crescentius, who in 997 set up John Philagathus, a native of the Greek Province of Calabria, as John XVI. He was overthrown by the return of the Emperor and treated with a cruelty which he did not long survive.—John XVII (Pope for a few months in 1003).—John XVIII (1003–09). He effected a temporary reconciliation with the Church of Constantinople and left the name of a learned and pious man. He is said to have retired to a monastery to end his days, but it is not improbable that he was driven out by the son of Crescentius.—John XIX (Pope, 1024–33), a Roman of the family of the counts of Tusculum. He succeeded his brother, Benedict VIII. He attempted to consolidate the renewed union with the East by conceding to the Patriarch of Constantinople, in a sense, the title of Ecumenical; but the feeling of Western Christendom was so strong against the concession that he was obliged to withdraw it, and the breach became wider than ever. He crowned the Emperor Conrad II in the presence of the English King Canute. His letters are in Migne, *Patrologia Latina*, vol. cxl (Paris, 1844–64).—John XX, often called John XXI (Pope, 1276–77), a Spaniard, Peter by name, made Cardinal Bishop of Frascati in 1273. He was a man of great learning, especially in philosophy and medicine. He left some treatises which are interesting contributions to the history of mediæval medicine. His enemies accused him of dealing in magic arts and considered his death by the fall of a ceiling as a judgment.

John XXII (Pope, 1316–34), Jacques d'Euse, a native of Cahors, made Bishop of Fréjus in 1300 and Cardinal Bishop of Porto in 1312. He was chosen Pope after a vacancy of two years and fixed his residence at Avignon. Attempting to carry out in very altered circumstances the vast and comprehensive policy of Gregory VII and Innocent III, he interposed in the contest for the Imperial crown between Louis of Bavaria and Frederick of Austria, in favor of the latter.

He was involved in several other controversies of a more theological nature; that on the poverty of Christ, which sprang up among the Franciscans (see Fraticellians), was partly connected with support given by the recalcitrant members of the order to Louis. His opinion that the just would not be admitted to the beatific vision until the general resurrection was vigorously opposed by many theologians, and he retracted it before his death. He endeavored to propagate the Christian faith in the most distant lands and to promote a crusade, in which he was hindered by the constantly divided state of Christendom. He collected large sums for the treasury of the Church, but his own life was simple and ascetic. Consult: Friedensburg, *Ludwig der Bayer und Friedrich von Oesterreich* (Göttingen, 1877); Verlaque, *Jean XXII, sa vie et ses œuvres* (Paris, 1883); Souchon, *Die Papstwahlen von Bonifaz VIII. bis Urban VI.* (Brunswick, 1888). —John XXIII (Pope, 1410–15), Baldassarre Cossa, of a noble Neapolitan family. He was made Cardinal in 1402. He took a prominent part in the Council of Pisa and in the effort to terminate the great schism by the elevation of Pietro Philargi as Alexander V. On Alexander's death he was chosen by the same dubious authority. He called the Council of Constance (q.v.), by which he was deposed. He fled, but was captured and imprisoned for four years, until he was released by the intervention of his successor, Martin V, who made him dean of the Sacred College. He died and was buried in Florence. Consult, for John XXII, XXIII, Pastor, *History of the Popes*, vols. i–xii (St. Louis, 1898–1913), and Mandell Creighton, *History of the Papacy* (6 vols., New York, 1899–1901).

JOHN I, Zimisces (925–976). A Byzantine Emperor (969–976). Nicephorus Phocas, who had mounted the throne by his aid, gave him the chief military command in the Empire. He ably seconded the Emperor in his victorious campaigns against the Saracens, but through jealousy he was deprived of his command. At the same time the Emperor was unpopular, and John was in love with the Empress; consequently he murdered the Emperor and himself mounted the throne. During his reign war was waged successfully against the Russians, whom he drove out of Thrace in 970–973, the Saracens, from whom he recovered part of Syria, and the Bulgarians. He is supposed to have been poisoned while on his return from the campaign in Syria. Consult: Schlumberger, *L'Epopée Byzantine*, vol. i (Paris, 1896), and Edward Gibbon, *Decline and Fall of the Roman Empire* (2d ed., by J. B. Bury, vol. v, London, 1901).

JOHN II, Comnenus or Kalojoannes (1088–1143). A Byzantine Emperor, called "The Good." He succeeded his father, Alexius, on the throne in 1118. Although himself a man of high character, and a winner of many victories in his wars against the Turks in Asia and against the Servians and the Hungarians in Europe, yet his administration was weak, and his whole government enfeebled by corruption. Consult Edward Gibbon, *Decline and Fall of the Roman Empire* (2d ed., by Bury, vol. v, London, 1901), and Chalandon, *Les Comnènes*, vol. i (Paris, 1912).

JOHN V. Byzantine Emperor. See Palæologus.

JOHN VI. Byzantine Emperor. See Cantacuzenus.

JOHN VII, VIII. Byzantine emperors. See Palæologus.

JOHN I (1350–95). King of Aragon and son of Peter IV, whom he succeeded on the throne in 1387. He maintained a school of troubadours at his court.

JOHN (1513–71). Margrave of Brandenburg-Küstrin, second son of the Elector Joachim I of Brandenburg, born at Tangermünde. He was better known as Hans of Küstrin, from one of the possessions which he secured upon the death of his father in 1535. Although brought up a Catholic, he introduced the Protestant religion into his dominions in 1537 and the next year joined the Schmalkaldic League, though with the express stipulation that it should be for the purpose of protecting religious belief and not for political reasons. Consequently, on the outbreak of the Schmalkaldic War, he joined the Emperor Charles V and took an important part in the battle of Mühlberg, where the Imperial forces gained a decisive victory over the Protestant princes (1547). At length realizing the mistake he had made, he went over to the Elector Maurice of Saxony and exerted himself on the Protestant side during the treaty making at Passau (1552). Internal peace once more restored to Germany, he accompanied the Emperor Charles V in his French campaign and took part in the unsuccessful siege of Metz. His chief title to fame, however, rests in the ability with which he governed his lands. He restrained the nobility, cleared the country of highway robbers, extended its frontiers, and encouraged agriculture, commerce, and industries.

JOHN I (1358–90). King of Castile from 1379 to 1390. He succeeded to the throne on the death of his father, Henry II. To defeat the schemes of John of Gaunt (q.v.), Duke of Lancaster, who had assumed the title of King of Castile, and of Ferdinand of Portugal, he attacked Portugal. Ferdinand submitted in 1382 and made peace by giving his daughter Beatrice, the heiress of Portugal, to John. On Ferdinand's death, in 1383, John again made war upon Portugal in support of the claims of Beatrice, and later fought against John I, who had been elected King of that country, but failed the first time on account of a pestilence and the second time was defeated at Aljubarotta in 1385. See Spain, *History*.

JOHN II of Castile (1405–54). Despite the mutually antagonistic opinions of two prominent historians (Menéndez y Pelayo and Burke), the reign of John II of Castile must still be considered of prime importance for the political and literary history of the end of the Spanish Middle Ages. John II, born in 1405, was but two years old at the time of his father's death. Castile again went into the hands of a Regent—Ferdinand, the brother of the late King (Henry III of Castile), who shared the regency with the widowed Queen Katherine (daughter of John of Gaunt and Constance of Castile). Fortunately for Spain, he was the best Regent Castile had yet had. In 1416 Ferdinand (who had become King of Aragon in 1412) died, and two years later Katherine died also, leaving an inexperienced boy of 13 to the tender mercies of dissolute favorites. In 1419, shortly after his marriage (1418) to Mary, the daughter of his uncle Ferdinand, he took the reins of government. From the death of Ferdinand, however, the real ruler of Castile was the celebrated Alvaro de Luna, a relative of the indomitable Antipope Benedict XIII. Accordingly the reign might more appropriately be called the reign of Alvaro de Luna. Plots and counterplots, revolutions and counter-revolutions, were the order of the day throughout the whole of the long reign. After the death of Queen Mary (1445), Don Alvaro brought about the King's marriage (1450) with Isabel of Portugal, who promptly broke the favorite's power by encouraging the King to assert his independence. In 1453 Don Alvaro was executed. A year after the marriage the Princess, later (after the death of her half brother Henry IV) Queen, Isabella was born.

A period so tumultuous as this would hardly seem propitious for literary productivity, and it is true that the great lights in it are not very numerous; but the sum total of lesser lights makes a galaxy only less brilliant than that of the great *siglo de oro*. John II has many points in common with his great ancestor Alfonso X (the Wise), but those very points in common accentuate the essential differences: John II was literary rather than scientific, pedantic rather than scholarly, formal rather than substantial, graceful rather than profound. Still he gave a not unintelligent protection to literary men and their works and did much for the universities and scholars. Consult: Comte de Puymaigre, *La cour littéraire de Don Juan II, roi de Castille* (2 vols., Paris, 1873); Fernán Pérez de Guzmán, "Generaciones y semblanzas," in *Biblioteca de autores españoles*, vol. lxviii (Madrid, 1877); Marcelino Menéndez y Pelayo, *Antología de poetas líricos castellanos*, vols. iv–v (ib., 1893–94); Emilio Cotarelo y Mori, *D. Enrique de Villena* (ib., 1896); Alonso de Palencia, *Crónica de Enrique IV: traducción castellana por Antonio Paz y Melia*, vol. i, books i and ii (ib., 1904).

JOHN (1167–1216). King of England from 1199 to 1216. He was the youngest son of Henry II by his wife, Eleanor of Aquitaine, and was born on Dec. 24, 1167. His father called him Lackland, probably because Henry had divided his dominions among his elder sons and thus left John without a portion. John was given, in 1177, the lordship of Ireland, and in April, 1185, he went over to take the reins of government, but ruled so badly that he was recalled the following September. John united with his brothers in their repeated rebellions against their father, and it was the sudden communication of the news of his having joined his brother Richard's uprising that caused the death of Henry. When Richard I succeeded to the crown, he conferred upon his young brother earldoms which amounted to nearly one-third of the Kingdom. This did not, however, prevent John from endeavoring to seize the crown during Richard's captivity. John was, nevertheless, pardoned on Richard's return and treated with great clemency and is said to have been designated by his brother on his deathbed as his successor. John hastened, at his brother's death, to obtain the support of the continental barons and then returned to England, being crowned at Westminster May 27, 1199. Arthur (q.v.), the son of his elder brother, Geoffrey, was, according to modern laws of heredity, the lawful heir to the crown, but at this time the rules of succession to the crown were still imperfect. The claims of Arthur were supported by the King of France, but John bought off the latter's influence. In 1200 he obtained a divorce from his first wife, Isabella or Avice of Gloucester, and married Isabella of Angoulême, who was betrothed to Hugh le Brun, son of Hugh, Count of La Marche, one of his vassals. In revenge Le Brun stirred up the nobles of Poitou against him and embraced the cause of young Arthur. In the war which ensued, Arthur, who was again assisted by France, was taken prisoner and confined in the castle of Rouen, where, according to tradition, he was put to death. As a result of the war, the English monarch lost to Philip Augustus of France Normandy, Touraine, Maine, Anjou, and Poitou. In 1207 John quarreled with the Pope concerning the appointment of a new Archbishop of Canterbury, and, as a result, the Kingdom was placed under an interdict in 1208; John in return confiscated the property of the clergy who obeyed the interdict and banished the bishops. He also compelled William, King of Scotland, who had joined his enemies, to do him homage (1209), put down a rebellion in Ireland (1210), and subdued Llewellyn, the independent Prince of Wales (1211). The Pope, in 1212, solemnly deposed John, absolved his subjects from their allegiance, and commissioned Philip Augustus of France to execute his sentence. John, denounced by the Church and hated for his cruelty and tyranny by his subjects, found his position untenable and was compelled, in 1213, to make abject submission to Rome and to hold his kingdom as a fief of the papacy. Philip Augustus, nevertheless, proceeded with his scheme of invasion, though no longer approved by Rome; but the French fleet was totally defeated in the harbor of Damme. Subsequent events, however, proved more favorable to France, and John's strength was crushed in 1214 by the defeat at Bouvines (q.v.). At length the English barons saw the opportunity to end the tyranny of John; they drew up a petition demanding the redress of abuses in the government and the administration of justice and the issuance of a charter of liberties modeled on that of Henry I. This was rejected by the King and became the signal for war. The army of the barons assembled at Stamford and marched to London; they met the King at Runnymede and on June 15, 1215, was signed the great charter, Magna Charta (q.v.). The Pope soon after annulled the charter, and the war broke out again. The barons now called over the Dauphin of France to be their leader, and Louis landed near Sandwich, May 21, 1216, and gained control over a large part of England. John attempted to regain this territory, but in crossing the Welland lost his regalia and treasures and part of his baggage and army. He was taken ill, and died at Newark Castle Oct. 19, 1216. John had five legitimate children: Henry III; Richard, Earl of Cornwall; Joan, Queen of Scotland; Isabella, Empress of the Holy Roman Empire; and Eleanor, whose second husband was Simon de Montfort. One of his illegitimate children married Llewellyn I, Prince of North Wales.

Bibliography. Great Britain Public Record Office, *Calendar of State Papers and Manuscripts*, vol. i (London, 1864); Kate Norgate, *England under the Angevin Kings* (ib., 1887); William Stubbs, *Constitutional History of England*, vol. i (6th ed., Oxford, 1897); Kate Norgate, *John Lackland* (New York, 1902); Davis, *England under the Normans and Angevins* (ib., 1905); Adams, *History of England from the Norman Conquest to the Death of John* (London, 1905); K. H. Vickers, "England in the Later Middle Ages," in his *History of England*, vol. iii (ib., 1913); S. K. Mitchell, "Studies in Taxation under John and Richard III," in *Yale Historical Publications, Studies 2* (New Haven, 1914).

JOHN II (1319–64). King of France from 1350 to 1364, surnamed "The Good." He succeeded his father, Philip VI of Valois, in 1350, and commenced his reign by acts of despotism and cruelty. The English invaded France, and John was defeated by Edward the Black Prince at Poitiers (q.v.) in 1356. John himself was taken prisoner, carried to Bordeaux and then to London, where he was detained until Oct. 25, 1360. His ransom was fixed by a treaty with Edward III at Brétigny (q.v.). In 1363 he secured for his son Philip the Duchy of Burgundy, which was destined to become a danger to France. His son, the Duke of Anjou, who had been in London as a hostage for the payment of John's ransom, escaped in violation of his parole, and thereupon John voluntarily returned in 1364 as a prisoner to London, where he suddenly died. Consult Lavisse, *Histoire de France*, vol. iv, part i (Paris, 1902).

JOHN III, Vatatzes, or Ducas (1193–1254). Emperor of Nicæa. His skill as a soldier led to his being chosen to succeed Theodore I in 1222. He reorganized the remaining portions of the East Roman Empire, extended his boundaries to Rhodes, defeated the Latin Emperor, and the final recapture of Constantinople was largely due to his efforts, although his own siege of that city in 1235 did not succeed. Consult Pears, *Destruction of the Greek Empire* (London, 1903).

JOHN IV, Lascaris (c.1250–c.1300). Emperor of Nicæa. He succeeded his father, Theodore II, in 1258, when he was scarcely 10 years old. Three years afterward he was deposed and blinded by Michael Palæologus. Consult Pears, *Destruction of the Greek Empire* (London, 1903).

JOHN II, Casimir (1609–72). King of Poland from 1648 to 1668. He was the youngest son of Sigismund III and on his father's death, in 1632, became lord of an extensive appanage in Poland. In 1640, however, he entered the Jesuit Order at Rome and was made Cardinal by Pope Innocent X. Returning to Poland, he was elected to succeed his brother, Ladislaus IV, as King in 1648, and married his widow, Maria Luisa Gonzaga, receiving from the Pope absolution from his vows. The first part of his reign was disturbed by the revolt of the Cossacks under Chmielnicki. In 1655 Charles X of Sweden made war upon Poland and in 1656 was joined by Frederick William, Elector of Brandenburg. In 1657 the Elector went over to the side of Poland, which in return formally renounced its suzerainty over East Prussia. Peace was made with Sweden at Oliva in 1660. By the Treaty of Andrussovo (1667) the Polish King ceded White and Red Russia and the Ukraine east of the Dnieper to Russia. Broken by misfortune, John abdicated at the Diet of Warsaw, Sept. 16, 1668, and retired to France. He died at Nevers, Dec. 16, 1672. See Poland.

JOHN III, Sobieski (1624–96). King of Poland from 1674 to 1696 and one of the greatest warriors of the seventeenth century. He was born at Olesko, Galicia, June 2, 1624, and was educated with great care, together with his brother Mark, by his father, James Sobieski, Castellan of Cracow, a man distinguished in the civil and military life of Poland. The brothers traveled in France, England, Italy, and Germany, until their father's death recalled them home in 1648. Poland was then on the decline and involved in constant wars with Sweden, Brandenburg, Russia, the Tatars, the Turks, and the Cossacks. The Sobieskis, as became their rank and training, entered the military service. Mark fell in battle against the Cossacks; John distinguished himself by his valor and became the most efficient Polish leader of his time. He became grand marshal in 1665 and commander in chief of the Polish forces and Waywode of Cracow in 1667. On Nov. 11, 1673, he defeated the Turks in the great battle of Khotin in Bessarabia. After the death of King Michael Wisniowiecki (1673) he was unanimously elected King of Poland (May 21, 1674). He turned from the French alliance, which seemed cemented by his election, to that of Austria because of a pique on the part of his wife, and when the Turks besieged Vienna in 1683 John hastened to its relief with 20,000 Polish troops. Near Vienna he was joined by the Duke of Lorraine and the Imperial troops, and on September 12 the combined army of 70,000 assailed the Turkish forces under Kara Mustapha in their camp around Vienna. The enemy, whose numbers are estimated at 275,000 men, were overwhelmingly defeated and driven back to the Raab. Sobieski was received with acclaim by the Viennese, but the Emperor Leopold showed strange ingratitude in his treatment of the deliverer and of the Polish army. Sobieski became the hero of Christendom, but this was the climax of his career. He was hampered by the wretched politics of the aristocratic Polish Republic and by the intrigues of foreign parties in his court, and the later years of his life were full of disappointment. He died of apoplexy, June 17, 1696. John Sobieski was not only a statesman and warrior, but a patron of science and literature. His constant wars, however, prevented that attention to the internal condition of Poland which its critical situation urgently required. He had, too, many of the faults of the high Polish nobility, and he was too much under the influence of his wife, an intriguing and frivolous woman. The family of Sobieski was extinguished with the death of the last descendant, in 1875. Consult: Tatham, *John Sobieski* (Oxford, 1881), the Lothian prize essay at Oxford in that year; Dupont, *Mémoires pour servir à l'histoire de Sobieski* (Warsaw, 1885), by a French officer in the Polish service under Sobieski; Salvandy, *Histoire de Pologne avant et sous le roi Jean Sobieski* (2 vols., new ed., Paris, 1855); Coyer, *Histoire de Jean Sobieski* (Amsterdam, 1761 and 1783); Waliszewski, *Acta* (3 vols., Cracow, 1684), extracts from the foreign archives of France in regard to the relations of Sobieski with that country; Rieder, *Johann III., König von Polen* (Vienna, 1883); Chelmecki, *König J. Sobieski und die Befreiung Wiens* (ib., 1883); Du Hamel de Breuil, *Sobieski et sa politique de 1674 à 1683* (Paris, 1894).

JOHN I, the Great (1357–1433). King of Portugal from 1385 to 1433, sometimes known as "The Bastard." He was the founder of the illegitimate Burgundian line and was born at Lisbon (being a natural son of Peter I). In 1364 he was created Grand Master of Aviz. After the death of his half brother, Ferdinand, in 1383, he became Regent and Protector of the Kingdom, and in April, 1385, was chosen King by the Portuguese in violation of the rights of the Infanta Beatrice, who had married John I, King of Castile. A war followed, resulting in favor of the Portuguese, who won the battle of Aljubarrota, in 1385. In 1415 John took Ceuta from the Moors. The island of Madeira was discovered in his reign largely through the efforts of his son, Prince Henry the Navigator (q.v.). The reign of John I, whose conquests and good government earned him the title of "The Great," marks the beginning of the heroic age in Portuguese history. He died, after a long and glorious reign of 48 years, in August, 1433, and was succeeded by Edward, the eldest of his six sons by his wife, Philippa of Lancaster. Consult H. M. Stephens, *Portugal* (New York, 1893), and V. de Bragança Cunha, *Eight Centuries of Portuguese Monarchy* (ib., 1911).

JOHN II, THE PERFECT (1455–95). King of Portugal from 1481 to 1495. He was born at Lisbon, being the son of King Alfonso V. In his youth he showed himself possessed of high courage and attainments. In 1471 he married Leonora of Lancaster and succeeded his father in 1481. He put to death for conspiracy the dukes of Braganza and Viseu in 1483. During his reign the African coasts were thoroughly explored by Portuguese navigators, and Bartholomeu Días discovered the Cape of Good Hope (1488). By the Convention of Tordesillas (1494) Portugal divided with Spain the newly discovered world in the Western Ocean. (See DEMARCATION, LINE OF.) John II was a monarch of remarkable political sagacity and broad views and sought in every way to promote commerce, art, and industry in his Kingdom. His premature death (Oct. 25, 1495) has been attributed to slow poisoning. His only son, Alfonso, having died in 1491, he was succeeded on the throne by Emmanuel, Duke of Beja, his brother-in-law. Consult J. P. Oliveira Martins, *O principe perfeito* (Lisbon, 1895).

JOHN III (1502–57). King of Portugal from 1521 to 1557. He was the son of Emmanuel the Great, whom he succeeded in 1521. He found Portugal at the very height of its power, but during his reign its influence began to wane, and it lost much of the prestige which it had formerly enjoyed. The Inquisition was introduced, and the control of the University of Coimbra was placed in the hands of the Jesuits. Colonial enterprise, however, continued under his reign. As a result of the Congress of Badajoz (1524), Portugal's title to Brazil was conceded by Spain, and a beginning was made towards the colonization of the country by its division into captaincies which were granted out to the great nobles to be held in feudal tenure. In the East Indies, too, the Portuguese power was greatly extended. Consult V. de Bragança Cunha, *Eight Centuries of Portuguese Monarchy* (New York, 1911).

JOHN IV, THE FORTUNATE (1605–56). King of Portugal from 1640 to 1656 and the founder of the Braganza dynasty. He was born at Villaviciosa in 1604, being descended from both the legitimate and illegitimate royal families of Portugal. Before an almost bloodless revolution raised him to the Portuguese throne in 1640, John IV was Duke of Braganza, which title he had inherited in 1630. In 1633 he married Luisa de Guzmán, oldest daughter of the Duke of Medina Sidonia and a woman of energetic personality. As leader of the patriotic party, he succeeded in 1640 in expelling the Spanish usurpers and making himself King, after the country had been 60 years under the yoke of Spain. His election was ratified by the Cortes in January, 1641. For 15 years John IV ruled Portugal with energy and ability, restoring the finances and promoting commerce and agriculture. The Spaniards were completely defeated early in his reign at the battle of Montijo (1644) and gave no further trouble. In 1649 and 1654 the Portuguese won important naval victories over the Dutch off the coast of Brazil. At the time of his death (Nov. 6, 1656) John had succeeded in restoring Portugal to her place among the nations and establishing his family firmly on the throne. Two of his sons succeeded him in turn, as Alfonso VI and Pedro II respectively, and his daughter, Catharine of Braganza, became the wife of Charles II of England, bringing Bombay as her dowry. Consult: J. Pinto Ribeiro, *Usurpação, retenção, restauração de Portugal, 1642* (Lisbon, 1642); J. de Vasconcellos, *Restauração de Portugal, 1643* (ib., 1643–44); E. de Faria y Sousa, *History of Portugal (down to 1640), Translated and Continued down to this Present Year, 1698, by Capt. John Stevens* (London, 1698).

JOHN V (1689–1750). King of Portugal from 1706 to 1750. He was the son of Peter II, whom he succeeded in 1706 in the midst of the War of the Spanish Succession, in which Portugal was involved as an ally of Great Britain and the Emperor. By the Treaty of Utrecht (1713) Portugal was confirmed in its possession of both banks of the Amazon. The King was a man of strong religious tendencies and devoted much attention to ecclesiastical affairs. Numerous churches and convents were erected, and to this end the army and the navy were allowed to sink into complete inefficiency. For thus turning the entire government of the Kingdom into the hands of the clerics, Pope Benedict XIV in 1748 bestowed upon him and his successors the title "Most Faithful King."

JOHN VI (1767 or 1769–1826). King of Portugal from 1816 to 1826. He was the son of Peter III and of Queen Maria I, who succeeded her father, Joseph I, in 1777. In 1792 Queen Maria became insane, and John took the reins of government into his own hands. In 1799 he was formally declared Prince Regent of the Kingdom. In 1807 Napoleon attempted to force upon the Regent the acceptance of the Continental System (q.v.), and on the latter's hesitation a French army under Junot entered the country. On November 27 the Prince Regent and the court sailed for Brazil, leaving the government in charge of a council of regency under the Marquis of Abrantes. On the death of his mother, in 1816, John became King. In Portugal, where the government after the expulsion of the French was carried on by Marshal Beresford, great dissatisfaction prevailed over the arbitrary character of the latter's rule, as well as over the continued absence of the court. In 1820 the troops at Oporto and Lisbon rose in insurrection and proclaimed a liberal constitution closely modeled on the Spanish constitution of 1812. King John returned to Portugal in 1821, leaving his eldest son, Dom Pedro, as Regent of Brazil, and gave his adhesion to the new constitution. The party of reaction, however, was strong, and headed by Queen Carlotta and her younger son, Dom Miguel, took courage from the presence of the army of the Holy Alliance in Spain to stir up an insurrection in northern Portugal (May,

1823) and succeeded in obtaining control of the King's person. The Cortes was dissolved, a new ministry was appointed, and an absolutist régime established. Alarmed by the liberal leanings of certain members of the new government, Dom Miguel resolved on a coup d'état, which was carried out April 29, 1824. On May 9 King John took refuge on board an English man-of-war and proclaimed his son a traitor. Dom Miguel was forced to yield to the pressure of the Powers and left the country. John was reinstated in power and restored the liberal constitution. He died March 10, 1826. Brazil in 1822 had declared itself independent under Dom Pedro as Emperor, and its independence was acknowledged by Portugal in 1825. On the death of John VI the crown of Portugal also fell to Dom Pedro, who resigned it in favor of his daughter, Dona Maria da Gloria. Consult V. de Bragança Cunha, *Eight Centuries of Portuguese Monarchy* (New York, 1911).

JOHN (1801–73). King of Saxony from 1854 to 1873. He was the youngest son of Prince Maximilian of Saxony and was born at Dresden, Dec. 12, 1801. In his youth he traveled in Italy, where he became an ardent student of Italian literature and a devotee of Dante. In 1830 he became commander of the local militia and was made a member of the Privy Council, taking his seat subsequently in the Council of State. As a member of the Upper Chamber, he exerted a very powerful influence on legislation. On the death of his brother, Frederick Augustus II, Aug. 9, 1854, he became King. In spite of his great attainments his statesmanship was not equal to meeting the crucial problems presented by the progressive rôle of Prussia in German affairs. In the War of 1866, acting upon the advice of his Prime Minister, Count Beust (q.v.), and hoping to strengthen Saxony, he embraced the cause of Austria. Saxony was invaded by Prussian troops, and after the defeat at Sadowa the King was forced to enter into the North German Confederation. He was loyal to the German cause during the Franco-German War of 1870–71 and played his part in the founding of the German Empire. He died at Pillnitz, Oct. 29, 1873. He published an excellent metrical translation of the *Divina Commedia*, with valuable notes (1839–49), under the pseudonym Philalethes. He also left manuscript translations of 70 English poems. He married, in 1822, Amalia Augusta, daughter of Maximilian Joseph, King of Bavaria, by whom he had nine children, of whom his eldest son, Albert, succeeded him.

JOHN of Austria (1545–78). A Spanish general, commonly known as Don John (Juan) of Austria. He was the illegitimate son of the Emperor Charles V by Barbara Blomberg, the then unmarried daughter of a citizen of Ratisbon, and was born Feb. 24, 1545. He was not at first acknowledged by his father, who nevertheless provided for his bringing up. In 1550 he was taken to Spain and until 1559 remained under the care of Don Luis de Quijada at the latter's castle of Villagarcía, near Valladolid. In his will Charles V recognized him as his son and intrusted him to the care of his successor, Philip II, who in 1559 granted him the rank of a prince of the house of Austria and an establishment at Madrid. He was educated together with the Infante Don Carlos and Alexander Farnese, Prince of Parma. In 1568 he was given the command of a squadron which operated against the Barbary pirates and in the following year was intrusted with the task of suppressing the Morisco rebellion in Andalusia. Though he was far from cruel by nature and protested earnestly against his instructions, Don John none the less carried them out relentlessly, displaying great military skill in the campaign. By November, 1570, all of the Moriscos had either been killed or made their submission. Upon the formation of the Holy League by Spain, the Pope, and Venice against the Turks in 1571, Don John was given the supreme command of a fleet of more than 200 galleys, with which he won a splendid victory over the superior forces of the Turks at Lepanto, Oct. 7, 1571, killing or taking more than 30,000 of the enemy and releasing more than 12,000 Christian galley slaves. His ambition to establish an independent kingdom for himself in Greece was frustrated by the opposition of the Spanish King. In October, 1573, he took Tunis from the Turks, hoping to make himself ruler of the city; but here, too, his plans shattered against the jealous refusal of Philip II. In 1576 he was appointed Governor of the Netherlands, to succeed Don Luis de Requesens. The Pacification of Ghent, signed in the same year, had united all of the provinces, except Luxemburg, against Spanish misrule, and Don John was forced to make the journey to the north disguised as a slave in the train of Ottavio Gonzaga. From Luxemburg he carried on negotiations with the Estates and was able to enter Brussels (May, 1577) only after he had issued his Perpetual Edict, reaffirming the immunities granted the Protestants by the Pacification of Ghent, and promising in addition the removal of the hated Spanish soldiery from the country. William of Orange, however, continued in his policy of opposition, out of distrust in the promises of the Spanish party, although Don John seems to have carried out the terms of the edict in sending the Spanish soldiers out of the country and delivering a number of castles into the hands of Flemish commanders. In December, 1577, Don John was deposed by the Estates, and William, as Protector of Brabant, took the field against him. With the aid of a Spanish army, brought to the Netherlands by Alexander Farnese, his old schoolmate, Don John won the victory of Gembloux, Jan. 31, 1578, but, for lack of support, was unable to prosecute the campaign. Philip II, who saw in Don John's success a possible danger to himself, delayed in sending him reënforcements, and this enabled the party of Orange to make headway against the Governor. He died suddenly at his camp near Namur, Oct. 1, 1578, his death being attributed to poison administered by order of Philip II. For such a conjecture, however, there is no basis of fact. Consult: Montplainchamp, *Histoire de Don Jean d'Autriche* (Amsterdam, 1690); Sir William Stirling-Maxwell, *Don John of Austria* (2 vols., London, 1883); J. L. Motley, *History of the United Netherlands* (4 vols., New York, 1900); Luis Coloma, *Story of Don John of Austria* (London, 1912).

JOHN of Brienne (?1148–1237). King of Jerusalem from 1210 to 1225 and Latin Emperor of Constantinople after 1229. When Mary became Queen of Jerusalem, the barons sent to Philip Augustus, asking him to choose a husband for her. He named John, who went to the Holy Land and married Mary in 1210. In 1212, on the death of the Queen, he became Regent for his daughter, who inherited the crown. He took an important part in the Crusade of 1218–21.

In 1225 the Emperor Frederick II, who had married John's daughter, forced him to resign the title of King. Soon after John took command of the papal troops in the attack upon Frederick's possessions. In 1229 he was chosen Emperor of the Latin Empire and spent the remaining years of his life in its service. Consult Georges, *Jean de Brienne* (Troyes, 1858). See Baldwin II.

JOHN of Cappadocia. Logothete and later prætorian prefect under the Emperor Justinian, after 530 A.D. He filled the Imperial treasury by taxation, but was noted for his dishonesty, cruelty, gluttony, and debauchery. In 541, by a stratagem of Theodora, he was detected in a crime and was exiled. After Theodora's death, in 548, he was recalled to Constantinople, and again reinstated in favor. But he is said to have died in poverty. Consult Edward Gibbon, *Decline and Fall of the Roman Empire* (ed. by J. B. Bury, vol. iv, London, 1898).

JOHN of Damascus, Saint (c.700–754). The author of the standard textbook of dogmatic theology in the Greek church. He was born at Damascus about 700 A.D. Like his father, he was a financial officer of high rank under the Caliph of Damascus. Much excited over the Imperial order forbidding the ecclesiastical use of images, he issued three letters, about 730, in behalf of image worship. Being outside of the Greek Emperor's authority, he escaped his wrath; but ultimately his position was made uncomfortable, and soon afterward he became a monk in the convent of Mar Saba, near the western shore of the Dead Sea and some 18 miles southeast of Jerusalem, where he spent the rest of his days in the composition of theological works and was ordained a priest. He died about 754 A.D. and had the honor of being canonized by both the Latin and Greek churches; in the former his day is May 6, in the latter December 4. He is one of the doctors of the Latin church. On account of his eloquence he has received the epithet Chrysorrhoas (the stream of gold). He was a man of extensive erudition and was considered the ablest philosopher of his time; but by some his writings are considered to show weakness of judgment and of critical power. His fame rests upon his three *Operations*, or letters upon image worship (trans. by Allies, *John Damascene's Treatise on Holy Images and Sermons on the Assumption*, London, 1899); and on his *Fount of Knowledge*, in three parts: (1) "Heads of Philosophy," (2) "Compendium of Heresies," and (3) "An Exact Exposition of the Orthodox Faith" (Eng. trans. of the third part by Salmond, in *Nicene and Post-Nicene Fathers*, 2d ser., vol. iv, pp. 1–106). He is also the reputed author of the tale of *Barlaam and Ioasaph*, in which Buddha becomes a Christian saint (Eng. trans. by Woodward and Mattingly, in the Loeb Library, New York, 1914). His complete works are in Migne, *Patrologia Græca*, vols. xciv–xcvi (Paris, 1854–66). Consult, for his biography, Langen (Gotha, 1879); J. H. Lupton (London, 1882); Alexander Whyte, *Father John of the Greek Church* (New York, 1898); Adolf Harnack, *History of Dogma*, vols. iii, iv (Boston, 1897–99); K. I. Burkhard, *Johannes von Damaskus Auszüge aus Nemesius* (Vienna, 1909). Douglas (London, 1901) has made him the subject of a poem.

JOHN of Gaunt, Duke of Lancaster (1340–99). The fourth son of Edward III of England. He was born at Ghent, whence his name (Gaunt). In the English wars with France and Spain he served with great bravery. He succeeded in 1361 to the Earldom of Lancaster in the name of his wife, Blanche, who was the daughter of Henry, Duke of Lancaster, and whom he had married in 1359. In 1369 his wife died; but two years later John married Constance, daughter of Peter the Cruel, King of Castile, whom the English had been aiding against his rival, Henry of Trastamare (q.v.). Peter the Cruel having been killed in 1369, John claimed the crown of Castile, but was never able to make any headway against Henry. The contest was ended upon the marriage of his daughter to the heir to the throne, in 1388. Meanwhile war had broken out with France also, and as the Black Prince was ill, John took command of the army, but was singularly unsuccessful, and the English lost nearly all of their conquests in France. The domestic affairs of England were also approaching a crisis, for Parliament objected to the corrupt practices of Lord Latimer and Richard Lyons, whom John protected, and to the influence of King Edward's mistress, Alice Perrers. In 1376 the so-called Good Parliament banished her, but, after it was dissolved and the Black Prince had died, John of Gaunt returned to power. He became involved, on account of his hostility to Bishop Wykeham, in a long contest with the clergy, in which he became allied with Wiclif (q.v.). His second wife died in 1394, and in 1396 he married his mistress, Catharine Swynford, whose children, the Beauforts, were declared legitimate by Parliament in 1397. He died Feb. 3, 1399, at Ely House in Holborn. He was the foremost patron of art and literature of his day, among his protégés being the poet Chaucer, whose material fortunes were dependent upon the Duke's career. His son, surnamed Bolingbroke, became in 1399 King of England under the title of Henry IV (q.v.). Consult: William Stubbs, *Constitutional History of England*, vol. ii (Oxford, 1896); Sydney Armitage Smith, *John of Gaunt* (London, 1904); G. M. Trevelyan, *England in the Age of Wycliffe* (New York, 1909); Sydney Armitage Smith (ed.), *John of Gaunt's Register* (2 vols., London, 1911); K. H. Vickers, "England in the Later Middle Ages," in his *History of England*, vol. iii (ib., 1913).

JOHN of Halifax, or Holywood. See Sacrobosco.

JOHN of Leyden, properly Jan Beukelszoon, Bockelson, or Bockold (c.1510–36). An Anabaptist fanatic. He was born in Leyden about 1510. For a time he wandered about as a journeyman tailor and then settled in his native city. Adopting the opinions of the Anabaptists (q.v.), he became one of their wandering prophets. In 1533 he went to Münster with Jan Matthys (Matthiesen), and when the latter lost his life in 1534 became his successor. He set aside the ancient constitution of the city, set up in Münster "the kingdom of Zion," appointed judges, and applied in an extravagant manner the principles of the Old Testament theocracy. He himself became "King of Zion." He introduced polygamy and displayed a great love of kingly pomp. In June, 1535, the town was taken by the Bishop of Münster. John and his chief accomplices suffered death under circumstances of fearful cruelty (Jan. 23, 1536), and his body was suspended in a cage from a church tower. He attempted to save his life by confession and submission. Consult E. B. Bax, *Rise and Fall of the Anabaptists* (New York, 1903). See ANABAPTISTS.

JOHN OF LUNA. See JOHN OF SEVILLE.

JOHN OF LUXEMBURG (1296–1346). King of Bohemia. His father, the German Emperor Henry VII (Count of Luxemburg), secured for him the hand of Elizabeth, daughter of Wenceslas of Bohemia, and in 1310 he was chosen King of that country. After his father's death, which occurred three years later, he hoped to be elected Emperor, but, finding that his youth was regarded as an insuperable obstacle, he threw all his influence on the side of Louis the Bavarian and against the Hapsburg candidate. Through the favor of the new Emperor he was able to add considerably to his kingdom, and so laid the foundations of that great German-Slavic dominion over which his son, Emperor Charles IV, was to rule. His reign began auspiciously, but was soon disturbed by internal discord, which had its origin in the race hatred of the Germans and the Czechs; and as John; not a great ruler in any case, spent most of his time away from Bohemia waging wars in the interest of Louis, of his native Luxemburg, and of the Teutonic knights, or squandering his kingdom's revenues at the gay court of France, affairs at home, left to the management of deputies, went from bad to worse. So greatly did the feeling of his subjects towards him change during these years that when, in 1339, he became totally blind, the same Bohemians who had welcomed his accession with extravagant demonstrations of joy now felt he was justly punished by God. Other misfortunes overtook him also. His second son, John Frederick, who had married Margaret, famous as Margaret Maultasch, Countess of Tirol, was discarded by his wife, who married the Emperor's son. This and John's growing intimacy with the King of France, whose papal protégé at Avignon had always opposed Louis's claims, led to a rupture between him and the Emperor. In July, 1346, he secured the election of his own son as King of the Romans in place of Louis, who was formally deposed. In the same year he accompanied Philip VI of France in his disastrous campaign against the English, and at the battle of Crécy, guided by a knight on either side, forced his way into the thick of the fight and there was killed. It was at this battle that Edward the Black Prince won his spurs, and, according to Camden, he adopted the Bohemian King's insignia, three ostrich plumes, and the motto "Ich dien," which ever since have been borne by the princes of Wales; but there is no proof for this statement. Consult Weech, *Kaiser Ludwig der Bayer und König Johann von Böhmen* (Munich, 1860), and Schötter, *Johann, Graf von Luxemburg und König von Böhmen* (2 vols., Luxembourg, 1865).

JOHN OF NEPOMUK, or POMUK (?–1393). A popular Bohemian saint of the Catholic church. The history of his life is very uncertain. He is said to have been born at Nepomuk between 1330 and 1340. Having entered into orders, he rose rapidly to distinction, being created a canon of the cathedral of Prague and eventually a vicar-general of the diocese. The legend is that, the Queen of Wenceslas IV having selected him for her confessor, Wenceslas, himself a man of dissolute life, conceiving suspicions of her virtue, required of John to reveal to him what he knew of her life from the confessions which she had made to him. John steadfastly refused, and the King, having first put John to the torture, at which he himself personally presided, had him tied hand and foot and flung, already half dead from the rack, into the Moldau (March, 1393). His memory was cherished with peculiar affection in his native country, and he was eventually canonized as a saint of the Roman Catholic church, his feast being fixed for May 16. By some historians two distinct personages of the same name are mentioned—one the martyr of the confessional zeal, the other of his resistance to the simoniacal tyranny of Wenceslas; but the two are probably identical. The historical John of Pomuk was not the Queen's confessor, but vicar-general of the Archbishop of Prague. The King wished to violate canon law in order to found a new bishopric for one of his favorites, but John refused to accede, and his torture and death followed as in the legend. Consult his life by Wratislaw (London, 1873) and by Frind (Prague, 1879); also August Amrheim, *Historisch-chronologische Untersuchungen über das Todesjahr des heiligen Johannes von Nepomuk* (Würzburg, 1884).

JOHN OF PROCIDA. See PROCIDA, JOHN OF.

JOHN OF SALISBURY (c.1120–80). An English scholar and churchman, for 30 years the central figure of English learning. He was born between 1115 and 1120 at or near Old Sarum. In 1136 he went to France, attended the lectures of Peter Abélard and other famous masters, and remained there for several years, studying logic, grammar, the classics, and theology. He was sent on important missions to Popes Eugenius III and Adrian IV, by whom he was received with great honor. When Thomas à Becket became Archbishop of Canterbury, he was made his secretary, was with him in his exile in France, returned with him to England, and witnessed his martyrdom. In 1176 he was appointed Bishop of Chartres. His greatest works are: *Policraticus sive de Nugis Curialium et Vestigiis Philosophorum* (first printed, 1476), in eight books, a work of great erudition, dealing with government, philosophy, and various learning; and *Metalogicus*, in four books, a defense of the studies of the schools against the sneers of the ignorant. His *Vita et Passio Sancti Thomæ* and his letters, numbering about 300, are of the highest interest. Other works are: *Entheticus*, an elegiac poem containing 1852 lines, which deals with the same subject as *Policraticus; Vita Sancti Anselmi; Historia Pontificalis*. He died at Chartres, Oct. 25, 1180. John of Salisbury is described as a graceful Latin poet, an impressive orator, and by far the most learned man of his age. Consult his *Opera*, edited by Giles (5 vols., Oxford, 1848); Schaarschmidt, *Johannes Saresberiensis nach Leben und Studien, Schriften und Philosophie* (Leipzig, 1862); William Stubbs, *Seventeen Lectures on the Study of Mediæval and Modern History* (3d ed., Oxford, 1900).

JOHN OF SEVILLE, also called JOHN OF LUNA and JOHANNES HISPALENSIS (Hispalis, Seville). A Jewish scholar of the twelfth century. He was engaged by Raimond, Archbishop of Toledo, in the translation of various Arabic works on philosophy and mathematics. He made at least some of his translations in Spanish, and these were put into Latin by Domenico Gondisalvi. Boncompagni published the text of one of his works, *Alghoarismi de Practica Arismetrice* (Rome, 1857). This is one of the oldest treatises concerning calculations with our numerals and zero. In spite of the title the original Arabic was probably not that of Mohammed ibn Musa (see AL-KHUWARIZMI), since it is much more developed than the arithmetical treatise of the latter.

JOHN OF SWABIA. See JOHN THE PARRICIDE.

JOHN OF WESEL. A German religious reformer who flourished about the middle of the fifteenth century. He was rector of the University of Erfurt (1456–57). He came under the ban of the Church by publishing an article against indulgences and escaped death at the stake only by recanting. He then entered a monastery, where he died in 1481. Of his writings there remain only *De Potestate Ecclesiastica* and *De Indulgentiis*. Consult Ullmann, *Reformatoren vor der Reformation* (2d ed., Gotha, 1866), and Clemen, "Ueber Leben und Schriften Johanns von Wesel," in *Deutsche Zeitschrift für Geschichtswissenschaften*, vol. ii (new ser., Freiburg, 1897).

JOHN THE CONSTANT (1468–1532). Elector of Saxony, son of the Elector Ernest, born in Schweidnitz. He succeeded his brother, Frederick the Wise, in 1525, and soon declared for the Reformation. The next year he entered into the Torgau Union with Philip I of Hesse and attended the Diet of Speyer. In 1528 he ordered a general parochial visitation in his dominions and in 1529 protested against a decision of the Diet of Speyer which was unfavorable to the Reformation. He was a bitter opponent of the Emperor Charles V at the Diet of Augsburg (1530). During the closing years of his life he devoted himself to organizing the Schmalkaldic League (q.v.).

JOHN THE FEARLESS (1371–1419). Duke of Burgundy from 1404 to 1419. He was the son of Philip the Bold. At the age of 25 he joined the King of Hungary against the Turks and was made prisoner at the battle of Nicopolis (1396). After nine months he was ransomed. He succeeded his father in 1404 as Duke of Burgundy, and on the death of his mother in 1405 became Count of Flanders. He was opposed by the French Queen and the Duke of Orléans, his rival. In 1407 he instigated the assassination of the Duke and soon obtained almost supreme power in France. (See CABOCHIENS.) This was followed by a civil war, in which John was aided by Henry IV of England. In 1414 and 1416 he formed alliances with Henry V of England and captured Paris in 1418, but was murdered on Sept. 10, 1419, at the instigation of the Dauphin, son of Charles VI, on the bridge of Montereau, where he had gone to meet the Dauphin. Consult Lavisse, *Histoire de France*, vol. iv, part i (Paris, 1902).

JOHN THE PARRICIDE (1290–?). The assassin of the German Emperor Albert I (of Austria), often known as John of Swabia. He was the son of Rudolph, Albert's brother. John, when he attained his majority, demanded from his uncle the whole or a part of his patrimony, but was met with a curt refusal. After a number of abortive attempts to gain his end, John, with others who had cause to complain of Albert's rapacity, formed a conspiracy against the life of the Emperor. While Albert was crossing the Reuss, near the castle of Hapsburg, on May 1, 1308, he was murdered by the conspirators. John disappeared, and nothing definite is known of his later life, though various accounts represent him as repenting of his deed and expiating his crime in a cloister. He is one of the characters in Schiller's *Wilhelm Tell*. Consult Mücke, *Albrecht I. von Habsburg* (Gotha, 1866).

JOHN, AUGUSTUS EDWIN (1879–). A British painter, draftsman, and etcher, one of the principal leaders of Impression in England. He was born in Wales and studied at the Slade Art School, London, and afterward independently in Paris, where he seems to have been influenced by Puvis de Chavannes. But he learned most from his study of the old masters and was himself wont to say that his earliest masters were Rembrandt and Piero della Francesca. His work, however, is strikingly original. As compared with some Impressionists, he is conservative in methods, especially in the matter of form. This is evident in his admirable drawings, which aroused such favorable criticism at the International Exhibition held in New York in 1913. His favorite subjects are small figures alone or in landscape; these are often types of repulsive ugliness, which at times approach caricature, yet, again, are subtle and naïve. His able portraits are somewhat decorative in treatment, with emphasis upon the salient characteristics of the sitter. In his paintings the line is flowing and easy, the color bright and attractive, the handling free and powerful. Among his best-known paintings are the "Spanish Flower Girl," "Mother and Child," "Seraphita," and several fine scenes from gypsy life. Among his best-known portraits are those of Professor Mackay and the mayor of Liverpool. In the technique of his powerful etchings the influence of Rembrandt is apparent; the best of his plates include several portraits of himself, the "Coster Girl," "Profile of Bella," "Maggie and Lucy," "Quarry Folk," and "The Valley of Time." Although John never gained recognition from the Royal Academy, he exercised a wide influence upon recent British art through his numerous pupils. He became a leader of the New English Art Club, where he chiefly exhibited.

JOHN, BAPTIST JOSEPH FABIAN SEBASTIAN, ARCHDUKE OF AUSTRIA (1782–1859). An Austrian prince and general. He was born at Florence, the son of Leopold I, Grand Duke of Tuscany, afterward the Emperor Leopold II. At an early age John showed considerable military talent, and in the wars with France he played an important part. As commander, he was extremely unfortunate. His army was crushed by Moreau at Hohenlinden (1801); he was defeated at Salzburg soon afterward; shared in the disaster of Austerlitz in 1805; was overthrown at Raab, June 14, 1809; and was unsuccessful in an attempt to join the army of his brother, Archduke Charles, at Wagram. He was popular, however, on account of his amiability, the interest he took in the sciences and public improvements, and above all his favorable attitude towards German unity, in which he stood alone among those who represented the Austrian policy. When the German National Assembly met at Frankfort, after the commotions of 1848, he was called by a great majority, on June 29 of that year, to be Vicar (Reichsverweser) of Germany. The progress of events being unfavorable to the Austrian interests, he resigned his office Dec. 20, 1849.

JOHN, EPISTLES OF. Three of the canonical Epistles of the New Testament. **The First**

Epistle. The literary form of 1 John is peculiar, and some have considered it a tract rather than an epistle. Yet it seems clear that the writer has a quite definite circle of readers in mind, whom he addresses in a tone of loving but authoritative familiarity; and although without definite address or signature, it is properly designated an epistle. In an introduction (i. 1–4), which reminds one of the Prologue to the Gospel of John, the writer states that the Word, who was manifested, with whom he and others had had personal experience, is the Word of life, to know whom is to have fellowship with the Father and the Son. To assist the readers to realize this truth and experience its joy is the purpose of the message that follows. Since God is light, emphasis is laid upon the necessity and possibility of separation from sin in order to fellowship with the light (i. 5–ii. 6). The result and evidence of fellowship with God is mutual love, the supreme duty of each towards the other (ii. 7–12), while the world with its attractions is to be shunned (ii. 12–17). The readers are then warned against those who deny Jesus to be the Christ (ii. 18–29). The full significance of being children of God is then unfolded (iii. 1–17), the realization of which, through faith, is equivalent to vital union with the truth (iii. 18–24). Once more (iv. 1–6) the false views, the spirit of Antichrist, are mentioned. One must oppose these, holding fast to the manifestation of love in the mission of Jesus, God's Son, and exemplifying it in his life of righteousness, faith, and love of the brethren (iv. 7–21). This gives the victory over the world (v. 1–5). Such is the unimpeachable testimony to Jesus, the Son, in whom is life (v. 6–12). With hints of the practical purpose of the Epistle (v. 13–17), a summary restatement of fundamentals (v. 18–20), and a final exhortation (v. 21), the Epistle closes, somewhat abruptly.

The Epistle itself contains no direct information as to its author, date, and place of writing, or persons addressed. The "we" (i. 1 et seq.) gives place to the singular (ii. 1, 7, 8, 12–14, 26; v. 13). The author thus indicates that he is one with others in his fundamental position, but is personally responsible for the Epistle as a whole. It was a time when new views, especially those of Gnostic tendency, were in the air. The view most repugnant to the author was probably a form of Docetic dualism which denied that Jesus was truly the Son of God and therefore the Christ (ii. 18–25, cf. iv. 1–3; v. 1–13). As this view does not appear to have been elaborated to any great extent when the Epistle was written, as it afterward was, a date somewhere near the beginning of the second century is most probable. The internal evidence being so insufficient, we must fall back (1) on traces of the work in early Christian literature, and (2) on comparison with the Gospel of John for facts touching its origin and destination.

The notices of 1 John in ancient literature are singularly full and direct. From the quotation and allusions in Polycarp's letter to the Philippians (c.115 A.D.), and the use of the Epistle by Papias (according to Eusebius' express statement), its circulation and high standing in Asia Minor soon after 100 A.D. cannot be doubted. It was known in the West as John's before the writing of the Muratorian canon (c.170 A.D.), which quotes its first verse. Irenæus, Clement of Alexandria, and Tertullian all speak of it as by John. That Marcion and possibly the Alogi did not accept it was due to dogmatic, not historical, reasons. If this strong chain of ancient testimony is to be accepted, we are brought to the same general date and situation as that with which the Fourth Gospel (see JOHN, GOSPEL OF) is concerned. A comparison of the vocabulary, leading ideas, and other characteristics of the Epistle with the Gospel has led the majority of scholars (H. J. Holtzmann, P. W. Schmiedel, and a few others are exceptions) to conclude that the two are products of the same mind and hand. A more difficult question is that of the respective dates of the two writings. There are no data at hand to decide this, but most scholars think that the Epistle is later than the Gospel. All that can be said with confidence is that during his sojourn in Asia the writer of the Fourth Gospel sent this message to a circle of believers (not necessarily to the church in Ephesus), with many of whom he was well acquainted, and by whom he was looked up to as a spiritual father, to warn them against dangerous views concerning Christ, and to impress upon them that faith in Christ must manifest itself in love and in a life separate from sin. Around those fundamental thoughts the whole Epistle revolves in a peculiar epigrammatic style, of great external simplicity, yet singularly rich and comprehensive in thought. The teachings antagonized contradicted the most important elements of Christian doctrine taught by the apostolic church. Whether they can be assigned to Cerinthus, the Ephesian heretic, we cannot decide.

The Second and Third Epistles. Unlike 1 John, the Second and Third Epistles have the formal address and signature of ordinary letters. The second is addressed to the "elect lady and her children." It is a question whether this designation indicates a person or a church. If the statement in 3 John 9, "I have written something to the church," refers to 2 John, it is decisive in favor of the former interpretation. On this hypothesis the relation between the two Epistles would be that of a general message to a church (2 John) supplemented by a more private note to an influential member, Gaius (3 John). The contents of the two accord well with this view. The letter to the church praises it for its faithfulness, exhorts to the exercise of mutual love in obedience to the command, warns against those who deny Jesus, the incarnate Messiah, and urges that they have no fellowship with such. It closes with a notice of the writer's intention to visit them soon, and a salutation from the sister church with which the writer was at the time. In the Epistle to Gaius, the elder commends his hospitality to missionary preachers, takes notice of the self-assertion of a certain Diotrephes whom he will bring to terms when he comes, recommends the imitation of the good, praises one Demetrius, and closes with a notice of his expected visit and the usual salutations.

The two Epistles thus seem to be companion letters. Should the address "elect lady" in 2 John 1 be taken to mean an individual, no connection between the two can be posited, except on the basis of a general similarity of style, and the fact that they have been associated in Christian tradition from ancient times, though their early history is obscure. Irenæus (c.180 A.D.) quotes 2 John 11 as a statement by John the disciple of the Lord. The Muratorian canon (c.170 A.D.) speaks of two Epistles of John after mentioning 1 John; but whether the reference is to 2 and 3 John or to 1 and 2 John is somewhat uncertain. Apparently Clement of Alexandria (c.200 A.D.) was acquainted with 3 John as well as with 1 and 2 John. Origen (c.225 A.D.) says that in his day doubts were expressed regarding their authorship. These doubts persisted, though their cause is not exactly known. Jerome assigned the Epistles positively to the Presbyter John, not to the Apostle. No quotation from 3 John has been discovered in the most ancient Christian writers, and external evidence for it before Origen is lacking. The tradition that the two Epistles were written by the Apostle is supported by the similarity in style, vocabulary, and thought to 1 John. The title Presbyter or Elder in 2 and 3 John is not inconsistent with authorship by the Apostle John, since Peter (1 Peter v. 1) speaks of himself as a "fellow elder." If the "Elder" or "Presbyter" John, mentioned by Papias, was some other one than the Apostle, it is, of course, possible that the letters were written by him, though many scholars continue to identify him as the Apostle. In the nature of the case the date, place of writing, and destination cannot be fixed.

Bibliography. In addition to the works cited under the article JOHN, GOSPEL OF, consult the commentaries of William Alexander (New York, 1881), Alfred Plummer (Cambridge, 1886), B. F. Westcott (3d ed., London, 1892); and especially the full discussions by M. W. Jacobus, in the *Standard Bible Dictionary* (New York, 1909), James Moffat, in his *Introduction to the Literature of the New Testament* (ib., 1911), and A. E. Brooke, in the *International Critical Commentary* (ib., 1912).

JOHN, yōn, EUGENIE. The name of the German author who wrote under the pseudonym E. Marlitt (q.v.).

JOHN, GOSPEL OF. The Fourth Gospel, according to the usual arrangement of the New Testament books. In some ancient manuscripts, such as the *Codex Bezæ*, it stands in the second place, in others in the third, while in some circles it heads the list. Its usual position in ancient times was, however, the same as the present. The general character of this Gospel and the influence it has had upon the Christian thought render it perhaps the most conspicuous book of the Bible and have naturally attracted to it the supreme attention of critical scholarship.

Contents of the Gospel. In striking contrast to the first three (or Synoptic) Gospels, the Fourth Gospel states explicitly the apologetic motive controlling its author in writing it (cf. xx. 30–31). It is in the light of this statement that the outline of its contents should be constructed. Understanding, then, that the author intended so to depict the person and work of Jesus that saving faith in him as the Son of God would result to his readers, the contents may be outlined as follows: *The Prologue* (i. 1–18), in which the profound significance of the historic Christ is set forth: he was the divine Logos incarnate, the life and light of man, who alone has revealed God, but who, when he came to "his own," was not received, though to receive him makes one a child of God. In the Prologue we find the fundamental ideas which the history following is intended to illustrate and prove—the divine glory of Jesus, the nature of the reception accorded him, faith on the part of some with its necessary results and unbelief on the part of others, and the significance of it all for the world.

The Main Narrative, which extends from i. 19 to xx. 29, opens with the events at the Jordan (i. 19–51), where the Baptist makes his confession to the Jerusalem delegation (i. 19–28) and bears his testimony to Jesus before his own disciples (i. 29–36), resulting in the gathering around Jesus of the beginning of a discipleship based on the attractions of a personal acquaintance with him (i. 37–51). This is followed by Jesus' return to Galilee, including the incident of the marriage at Cana, where his glory is displayed and his disciples' faith in him is deepened (ii. 1–12). There is then begun the record of *a series of visits to Jerusalem*, with the miracles and discourses accompanying them, which appears to form the general scheme on which the narrative is framed.

The *first visit* occurs at the Passover following the above return to Galilee (chap. ii). During the feast Jesus discloses himself to the Jerusalem populace as a reformer zealous for the purity of the temple worship by driving out the traders from its courts. The result of this action is an official inquiry as to his authority for such boldness, to which Jesus replies with a challenge to the materialism exhibited in this commercializing of the house of God, predicting a spiritual religion in place of that which they have so grossly degraded (ii. 13–22). The result of his stay in the city is a sort of halfway belief in him on the part of many (ii. 23), of whom Nicodemus is presented as a type, and Jesus' conference with him as representing the noncommittal attitude which Jesus assumed in response to it (ii. 24–iii. 21). Jesus then withdraws into Judæa to a region in the neighborhood of the Baptist's work and carries on a ministry which attracts many to his following, resulting in jealous queries on the part of John's disciples, which were answered with a renewed testimony of John to Jesus (iii. 22–30). The attention of the Pharisees being drawn to the extension of Jesus' work among the people, Jesus returns to Galilee, passing through Samaria, where he has his interview with the woman at the well and wins a general faith from the people of her village (iv. 1–42). On his arrival in Galilee he finds the people receptive to him, because of what they had witnessed of his works during his stay in Jerusalem (iv. 43–45). Coming again to Cana, he heals there the nobleman's son in response to a definite and distinctive faith on the father's part, which was deepened by the miracle and participated in by the entire household (iv. 46–53).

There then follows the *second visit* to Jerusalem, with its healing of the impotent man at the Pool of Bethesda and its following discourse to the people, who, however, are not only no more receptive to him than at the first visit, but, under the influence of their religious leaders, develop a hostility towards him that seeks his death (chap. v). Jesus is then represented as again in Galilee, where he feeds the multitude by the sea and, declining their enthusiastic effort to commit him to a programme of political revolution, returns to Capernaum, where, in a discourse that searches their religious materialism, he presents to the people his spiritual claims for himself and his work. The result of this discourse is depressing—many of the people falling away from his following, and the disciples themselves renewing their allegiance in a spirit lacking all enthusiasm (chap. vi).

This experience in Galilee is followed by a *third visit* to Jerusalem, at the Feast of the Tabernacles, during which Jesus again discourses to the people, however, practically without any receptive response on their part, but with renewed hostility from the Pharisees and chief priests, culminating in an unsuccessful effort to arrest him (chap. vii). Omitting the incident of the woman taken in adultery (viii. 1–11), which has evidently been interpolated from outside sources, Jesus' teaching is continued. It results, however, in an increasing irritation on the part of the people, ending in an attempt to stone him, from which, however, Jesus escapes (viii. 12–59). In the following chapter there is a *further visit* to Jerusalem, where Jesus restores sight to the man born blind—the miracle developing a controversy between the man and the Pharisees which results in the ecclesiastical disowning of the man and the personal expression to Jesus of his worshipful belief in him (ix. 1–40). Whether the discourse given in the first 18 verses of the tenth chapter belongs to this incident or to a *later visit* at the Feast of Dedication (x. 22, 23), or whether the healing of the blind man took place at this later feast, may be open to debate; but Jesus' teaching, as given in this tenth chapter, rouses the people to added hostility and a renewed effort on their part to lay hands upon him (x. 1–39). Upon this, Jesus withdraws from the city to the other side of the Jordan, where he subsequently receives word of the illness of Lazarus and, *returning to Bethany* and finding him already dead and laid away in the sepulchre, brings him back to life (x. 40–xi. 44).

The result of this astounding miracle is a conviction of faith on the part of many and at the same time a council of the Pharisees to decide upon what was to be done to counteract the increased reputation which it had brought to Jesus (xi. 45–52). The issue of their deliberation is a determination to put Jesus to death (xi. 53). In consequence of this official resolve, Jesus withdraws to a small town a short distance from Jerusalem, where he tarries with his disciples until the time of the Passover Feast (xi. 54–57). Shortly before the feast he *comes back to Bethany*, where a supper is made for him in Lazarus' home. During the supper Mary anoints his feet with costly ointment, and, upon Judas' criticism of the extravagance of the act, he commends her for what she has done (xii. 1–8). On the following day he makes his public entry into the city, accompanied by a following whose enthusiasm depresses with a new irritation the hostile Pharisees (xii. 12–19). There is then narrated the incident of the Greeks at the feast, their desire to see Jesus, and the discourse to the multitude which their request prompts him to deliver—a discourse full of significant allusions to the fatal ending of his work which he already sees approaching (xii. 20–50).

In the narrative scheme of the Gospel this ends his public ministry. The remaining portion of the record is devoted to a disclosure of the intimate fellowship between Jesus and his disciples in the closing hours before his arrest. To this are devoted five chapters (xiii–xvii), the first describing the Last Supper—a meal which, according to this Gospel, preceded the Passover Meal. During this Supper Jesus makes announcement of the coming betrayal of himself by one of the disciple band and singles out Judas as the betrayer, though apparently without bringing the other disciples to a realizing sense of what he meant. Chapters xiv–xvi are then devoted to a record of Jesus' farewell words to the disciples. These are followed by an intercessory prayer, with which the meal is apparently closed. Then comes the narrative of Jesus' arrest by the band led by Judas and the taking of him away to Annas and the high priest Caiaphas for examination, along with which is given the story of Peter's denial (xviii. 1–27). The remainder of this and the first part of the following chapter record the arraignment of Jesus before Pilate, his examination by the Governor, that official's effort to free the Prisoner, and his final surrender to the insistent demand of the chief priests, supported by the now hostile multitude, that Jesus be put to death (xviii. 28–xix. 16). Then follows the narrative of the crucifixion and the hasty entombment (xix. 17–42). The closing chapter gives the visit of Mary Magdalene to the tomb on the first day of the week, her discovery that it was empty, and her hasty report of the fact to Peter, with the hurried repairing of that and "the other disciple whom Jesus loved" to the sepulchre and their return to the city, mystified at the fact which they could not but believe, the appearance of Jesus to Mary after they had left, and his subsequent disclosure of himself to two gatherings of the disciples as they were met together secretly in the city for fear of the Jews (xx. 1–29). The last two verses of this chapter (30 and 31), giving as they do the motive for the preceding narrative of the Gospel, show that the following chapter, with its narrative of the meeting of Jesus with the disciples at the Sea of Tiberias, is an appendage to the Gospel (xxi. 1–23). This added chapter itself is closed with an assurance on the part of those who published the Gospel as to the reliability of the record, with the impression of the writer representing them as to its relation in extent to the whole of Jesus' ministry (xii. 24–25).

This is the arrangement of the contents as we have them in the Gospel before us. That this arrangement is not the original one, however, is evident from some obvious misplacements of the material, whether due to accident or to faulty editorial work—e.g., chapter v is properly to be inserted before vii. 15; vii. 1–14 and viii. 12–20 before vii. 25; vii. 37–44 after vii. 52; xii. 36b–43 after xii. 50; chapters xv and xvi either after xiii. 20 or after the introductory words of xiii. 31, bringing chapter xiv at the close of the valedictory remarks and immediately preceding the intercessory prayer of chapter xvii; xviii. 19–24 after xviii. 13.

The narrative, however, whether in its present or its original arrangement, is in marked contrast with what we find in the first three Gospels and, apart from the character of the contents, naturally arouses the attention of scholarship.

Criticism of the Fourth Gospel. The main question to which this Gospel gives rise is, Can it be considered an historical source for our knowledge of Jesus Christ? The Gospel gives no indication of its authorship, beyond some veiled allusions to one of the disciples, which, however, are of a significant character. They occur at xiii. 23, xix. 26, xx. 2, xxi. 7, 20, and refer to the disciple as "the disciple whom Jesus loved." This phrase is either the author's way of referring to himself or the editor's way of describing him; in either case, as it is generally conceded, it is intended to identify to the readers the writer of the narrative. Such a phrase naturally could be used only of one of the three disciples whom Jesus had taken into his intimate companionship—Peter, James, or John. Of these, however, Peter is excluded, because of his definite naming in some of these passages along with this peculiarly described disciple (xiii. 23 f.; xx. 2–10; xxi. 7, 20–23; cf. also xviii. 15 f.). James also is excluded because of his early martyrdom (Acts xii. 2, 44 A.D.), which occurred before there was any possibility of this Gospel having been written. John alone remains, and, while he is nowhere else referred to by this description, it is significant that he is found in such companionship with Peter in the life of the Jerusalem church (Acts iii. 1–11, iv. 1–22, viii. 14; cf. also Gal. ii. 9) as would correspond with the companionship of Peter and this described disciple in our Gospel (see above passages; cf. also Luke xxii. 8). The question becomes, therefore, whether the Apostle John could have written this Gospel. In a careful study of the narrative several things become evident. Among the most obvious is that the writer's knowledge of contemporary Judaism and of Palestine is remarkable. He shows himself perfectly at home in regard to numerous details of Jewish national affairs (xviii. 19, 24, 31; xix. 7), Jewish parties (vii. 45–52; xi. 49), Jewish customs (x. 22 [cf. 1 Macc. iv. 59]; vii. 2–13; iv. 45; vii. 37; xix. 31, 42; xviii. 28; xi. 55–57, ii. 1 ff. [cf. iii. 39]; xi. 44; xix. 39 f.), Jewish prejudices (iv. 9, 27; vii. 15, 49), and Jewish Messianic hopes (chap. vii). He has also an intimate knowledge of the topography of Palestine (e.g., i. 28; ii. 1, 11; iii. 23; xi. 54; iv. 5 f., 11, 20; vi. 19, 22–25) and of Jerusalem (e.g., iii. 20; v. 2; viii. 20; x. 23; xviii. 1; xix. 13, 41). Besides this, he is sufficiently acquainted with the Hebrew text to correct the Septuagint rendering of his quotations by the original reading, e.g., the citation from Zech. xii. 10 (xix. 37) and that from Ps. xli. 9 (xiii. 18); while his style bears throughout the Hebrew stamp and betrays a Hebrew influence. These facts can only be accounted for on the supposition that the writer was a Jew of Palestine by birth and education. It is almost inconceivable that a Gentile could have written as he did. At the same time he was a Jew whose break with formal Judaism was complete. He was no longer a Jew at heart. It may be said further that the Gospel seems to have been written by one who was an eyewitness of many of the events he recorded. Attention has often been called to the fact that the references to persons, such as Peter, Philip, Thomas, Judas Iscariot, Pilate, Mary, Martha, and others, brief as they are, betray the impressions made by such persons on one who had seen or heard them. They are remarkably lifelike and tally exactly with what is known of them from other sources. Many incidental touches in the narrative, such as "Jesus sat thus on the well," "it was about the sixth hour" (iv. 6), are best explained as due to personal experience. In addition to such incidental indications of authorship by an eyewitness, there are express statements to the same effect. In i. 14 it is said, "and we beheld his glory." This "we" seems to mean the author addressing his readers. We also at xix. 35 find brief notices by another hand, "he that hath seen hath borne witness and his witness is true, and he knoweth that he saith true, that ye also may believe," and at xxi. 24 that "this is the disciple that beareth witness of these things and wrote these things, and we know that his witness is true." It appears, then, that the work claims to be derived either wholly or in part from written records of an eyewitness. From the last citation it is evident that the claim is that the disciple mentioned in the immediately preceding section (xii. 15 ff.), i.e., the disciple whom Jesus loved, is the witness and recorder referred to. That is, the Gospel proper, which closes with xx. 31, and possibly the additional narrative of xxi. 1–23, were derived from the written and oral testimony of this disciple. As to the *date* of the Gospel, apart from whether the last chapter was written by the author or by another hand or hands, the maturity of the Gospel's thoughts, as seen in the selection of its material, is evidence of the lateness of the writing. For it is difficult to account for such selection, except in the author's times; while the advance which the Gospel's thought shows upon that of the Synoptics finds its natural explanation in the advance of the thought of the Church, which must have progressed with an advance in the age.

There is nothing to determine the *place* of the Gospel's writing, except in so far as the lateness of its date would indicate most probably a place outside of Palestine. As to the *purpose* of the writing, it is clear that the author had no intention of producing a history—for the narrative is too meagre for that—nor of presenting a biography—for all we get is but occasional glimpses of Jesus' life. The closing verses of chapter xx show us that the author's purpose was purely religious—to bring out the personality of Christ as it had impressed itself upon the author's own spiritual life. From all this study of the Gospel's contents it is clear that they confirm rather than contradict an authorship by the Apostle John.

Turning now from the Gospel to the records of the early Church, the facts are these: Writers of the period 170–200 show great familiarity with the Gospel, quoting it frequently and often speaking of John the Apostle as the author. In addition to this there are several explicit statements of importance. Irenæus (c.130–200), whose early home was in Asia Minor, declares that it was by John the Apostle, who spent his last years in Ephesus and there wrote the Gospel to counteract the teachings of Cerinthus (q.v.) (*Adv. Hær.*, ii, 22, 5; iii, 1, 1; iii. 4; xi. 1). Polycrates, Bishop of Ephesus, in a letter to Victor of Rome (c.190), speaks of John, "who reclined on the breast of the Lord," as buried in Ephesus. Polycarp (born or converted about 69 A.D., martyred 155), Bishop of Smyrna, was known to Irenæus, who as a youth heard him tell of his intercourse with John and others who had seen Jesus (Eusebius, *Hist. Eccles.*, v, 20). In such statements we have the testimony of personal experiences carrying us back to John himself. Justin Martyr, writing c.150, who had already spent some time in Ephesus, uses the Gospel as one of the apostolic memoirs, but says nothing about it in particular. Evidence for the existence and use of the Gospel before Justin is not entirely lacking, though not altogether certain. It is likely that it was known to Ignatius of Antioch (c.110–115), to the writer of the Epistle to Barnabas (c.125), and to the early Gnostic Basilides (c.125). External evidence, then, quite clearly points to the existence of the Gospel soon after 100 A.D., assigns it to John, and indicates Ephesus as the place where it was written. The general bearing of the external testimony is therefore confirmatory of the favorable bearing of the internal evidence to the effect that the Fourth Gospel was written by the Apostle John, late in life, at Ephesus in Asia Minor.

Nevertheless, by some modern critics this view is pronounced untenable. The more important reasons for such an opinion are: 1. The character of the teachings in the Fourth Gospel and the representation there given of Jesus' life and words are, on the one hand, so different from what we have in the first three Gospels, and, on the other hand, fit in so well with the doctrinal developments of the first half of the second century, that it seems necessary, apart from the question of authorship, to consider it a product of early second-century thought. Such a position practically necessitates giving up the Johannine authorship. 2. The evident use made of the Synoptic Gospels by the Fourth Gospel does not accord with apostolic authorship of the latter. 3. The vagueness in the recorded tradition of Asia Minor makes it possible that it was John "the Elder," rather than John the Apostle, who worked there, and that soon after his death, by an easy confusion, much of his activity was ascribed to John the Apostle, who may not have lived in Ephesus at all. 4. Certain particulars in the history of Christianity in Asia Minor, especially the appeal of Polycarp to the authority of John in the quartodeciman controversy, which is said to contradict the statements in the Gospel, show that early in the second century the Gospel was not recognized in that region as of apostolic origin.

The latter two of these arguments rest on such uncertain grounds that much weight should not be attached to them. The quartodeciman controversy in its early stages was concerned with the question of the proper time to begin the observance of Easter, the Christian Passover, and did not touch the question of the particular day of the month when Jesus ate the Last Supper. Polycarp claimed that John had taught them to celebrate the Passover regularly on the 14th of Nisan, the usual Jewish day. Even if, with many, we should hold that the Fourth Gospel places the Last Supper on the 13th of Nisan, Polycarp might easily have made his appeal to John and also considered him the author of the Gospel. The third argument presents a possibility, but not a probability. It may be said with confidence that such a confusion of ideas among men who had personal knowledge of the facts is altogether unlikely. It does not appear to have been noticed by the advocates of this theory that the confusion of John the Presbyter and John the Apostle must have antedated the Gospel itself; for not only xxi. 1–23, but the whole book, rests on the supposition or claim that the Apostle John is its authority. But this involves improbabilities that are fatal to the supposition. There must have been substantial reasons for the claim of the Gospel to be Johannine and for the ready acceptance of it as such by the leaders of the church in Asia Minor. In fact, for the residence in Asia of another so-called Presbyter John we have really no proof whatever.

There remain, however, the first two objections noted above. What is to be said regarding them? That the discourses of the Fourth Gospel are different from those of the Synoptics is not to be denied. Not only do they substitute an allegorical form of statement for the parabolic form so characteristic of Jesus' teachings in the Synoptics, but they almost exclusively substitute Jesus himself as the subject of the discourse in place of the varied and practical topics of the Synoptic talks, while they treat this self subject almost exclusively at the point of Jesus' divinity and his relation to the unseen world (cf. chaps. i–iii, v–viii, x–xvi). In the consideration of these facts it seems as though there should not be ignored the difference in the surroundings in which these two sets of discourses were delivered, the difference in the audiences to which they were spoken, and the difference in the narrators by whom they were reported. There can be no question that there was a development in Jesus' ministry, both in the conditions to which it was subjected and its adjustment to those conditions. It would hardly seem possible that over against this Jesus' teachings should be the same in content and form throughout his ministry. In fact, had the Synoptics represented him as delivering to the peasants of Galilee, who were largely loyal to him, and during the early practical period of his work, the same sorts of discourses on the same sorts of themes as the Fourth Gospel represents him as delivering to the speculative scribes and Pharisees of Jerusalem, who were largely hostile to him, and during the later controversial period of his work, the credibility of the Synoptics would have been justly called in question. And the same suspicion would have been aroused against the Fourth Gospel had it represented Jesus as delivering to the religious leaders of Jerusalem, at the close of his ministry, the same sorts of discourses as the Synoptics represent him as delivering to the country folk of Galilee at its beginning. As a matter of fact, to the extent that the Synoptic discourses are suited to the Galilean crowds and the circumstances of the Galilean work, and the Fourth Gospel discourses to the people and leaders of Jerusalem and the circumstances of the Jerusalem work, to that extent are both sets of discourses supposable.

It is significant that the only discourse which Jesus is represented by the Fourth Gospel as delivering outside of Jerusalem and to a Galilean audience so effectually confused and confounded those who heard it that it practically ended Jesus' successful work in that region. It is quite likely that had Jesus delivered to his Jerusalem audiences a discourse characterized with the beatitudes and the homely phrases of the Sermon on the Mount, it would have been as lost upon their ears as the discourse of the sixth chapter of John was upon those of the Capernaum people. It is no objection to this line of argument to say that the discourse of chapter v was delivered in Jerusalem during the early part of his ministry; for with the right placing of the chapter after the sixth chapter it takes its place with the other discourses of his later Jerusalem work.

And, further, there is the question of the personal qualifications and capacities of John—what he was able to produce. To say that the theology or philosophy of the book is such that John could not have written it, is to take a purely hypothetical and even arbitrary position. We do not know, and have no means of knowing, what John could have produced. Some one wrote the book, and he was a gifted man. He may as well have been John as any other Christian Jew. That the book marks a stage of thought supplementary to the primitive apostolic and Pauline developments is frankly admitted. If it was by John, it simply reflects the growth of his own religious experience. He had lived close to the Master, he had seen the origin and progress of the Church, he had known Paul, and at last he had lived for some time in the speculative atmosphere of Ephesus. This book gives his final judgments, his memory of Jesus, his impressions of him after these years of experience.

Finally, there is the question of the narrative relation of the Fourth Gospel to the first three. This demands very careful consideration. There can be no doubt of the fact that it was written on the supposition that its readers were acquainted with a Gospel history substantially identical with that in the Synoptics. Its own record is fragmentary and presupposes many things as well known. At the same time its attitude towards this already current history is one of independence. In fact, it is being discovered that at several important points the Fourth Gospel supplies data by which alone the Synoptics can be rightly understood. There is, e.g., in the Synoptics no explanation of why Jesus suddenly gave up his successful work in Galilee to draw aside into that period of retirement in the regions of Tyre and Sidon and the Decapolis. It is a puzzle, apart from the information given us by the Fourth Gospel of the collapse of his Galilean work (chap. vi) and the murderous hostility of the religious leaders in Jerusalem (chap. v). More than this, the Synoptics are not always historically reliable. It is the Fourth Gospel, and not the Synoptics, which gives us the correct statement as to when the Last Supper was had with the disciples. The old contention that either the Synoptics or the Fourth Gospel must be taken as genuine is being abandoned by scholars today, and the conviction is growing that with proper allowances both may be historically accepted.

General Conclusions. In view of all the facts of the case, the Fourth Gospel may be said to be the work, in substance at least, of the Apostle John, written towards the end of his life at Ephesus primarily for Christian circles, to give them an adequate conception of Jesus. The work was written when speculation was rife. Gnosticism was beginning to manifest itself. Terms such as "Logos," adapted from Alexandrian Jewish philosophy, were being used in Christian circles. The central truths of Jesus' unique personal significance were in danger of being obscured. To counteract such teachings John wrote his Gospel, prefacing it with the Prologue, in which he stated his conviction that the one truth that gave life and reality to ideas and speculation concerning the Logos was this, that Jesus Christ was the Logos incarnate, in whom grace and truth, the fullness of the knowledge of God, was manifest and placed within man's reach. The Gospel so written concluded with xx. 31 and may have been known for a time to a limited circle without the concluding chapter. But later, possibly not long before John's death or very soon after the work was published, and in order to correct a wrong impression concerning Jesus' words to Peter in reference to John, the last chapter was added, concluding with the guaranty of the Apostle's authorship of the entire work. No sooner was the work known than it met with acceptance, copies quickly finding their way all over the Christian world. A small sect, later called the Alogi, objected to it, not because they had any more correct knowledge of its origin, but because of its teachings, ascribing it to Cerinthus, according to tradition a bitter opponent of John in Ephesus. By 160–170 it was known and used along with the earlier three Gospels throughout the Christian Church.

Bibliography. The literature of the Fourth Gospel is very extensive. Fairly complete lists will be found in Luthardt, *Saint John, the Author of the Fourth Gospel*, translated by Gregory (Edinburgh, 1875), and in Watkins, *Modern Criticism Considered in its Relation to the Fourth Gospel* (Bampton Lectures, London, 1890). Besides the *New Testament Theologies* of Weiss, Beyschlag, Holtzmann, Stevens, and Feine; the works on the apostolic age by Lechler, Hausrath, Weizsäcker, Bartlett, McGiffert, and Ropes; the *Commentaries* of Meyer, Weiss, Godet, H. Holtzmann, O. Holtzmann, Westcott and Zahn; the various *Lives of Christ*, and the larger *Introductions* to the New Testament, especially those by Weiss, H. Holtzmann, Salmon, Jülicher, Zahn and Moffatt, attention may be called to J. B. Lightfoot, *Essays on Supernatural Religion* (London, 1889); Ezra Abbot, *External Evidence of the Fourth Gospel* (New York, 1891); J. B. Lightfoot, *Biblical Essays* (London, 1893); Lowrie, *Doctrine of Saint John* (ib., 1899); Wendt, *Gospel According to John* (trans., New York, 1902); Stanton, *The Gospels as Historical Documents*, part i (Cambridge, 1903); Drummond, *Character and Authorship of the Fourth Gospel* (New York, 1904); Sanday, *The Criticism of the Fourth Gospel* (Oxford, 1905); Scott, *The Fourth Gospel: Its Purpose and Theology*, in "The Literature of the New Testament Series" (Edinburgh, 1906); Bacon, *The Fourth Gospel in Research and Debate* (New York, 1910); Lewis, *Disarrangements in the Fourth Gospel* (Cambridge, 1910); with articles by Inge and Brooke in *Cambridge Biblical Essays* (London, 1909). See De Boor Fragment.

JOHN, Griffith (1831–1912). A Welsh missionary, born at Swansea and educated at Brecon College, Bedford. He began preaching when only 14 years old, volunteered to serve as a missionary under the London Missionary Society in 1853, and two years later arrived in China. The first five years were spent in evangelical work around Shanghai; he then traveled extensively in central China and went to Hankow in 1861. With his associates he established more than 100 missionary stations in Hupeh and Hunan provinces. His most important work, however, was the translation of the New Testament and the greater part of the Old Testament into Chinese in what is known as the *Wen-li Version*. He established the first Protestant missions in the Yang-tse valley and the theological college that bears his name and published many books and tracts in Chinese. Consult William Robson, *Griffith John, Founder of the Hankow Mission, Central China* (London, 1888).

JOHN, Revelation of Saint. See Revelation of Saint John.

JOHN, Sir William Goscombe (1860–). A Welsh sculptor. He was born at Cardiff and as a youth assisted his father, a wood carver, in the restoration of Cardiff Castle. He went to London in 1882 and studied at the Lambeth Art Schools under Dalou and Frith and afterward at the Academy schools, where he won the gold medal and a traveling scholarship in 1887. In 1890–91 he studied in Paris. His art usually strives to reproduce the severe dignity of the Gothic style and excels in skillful and delicate modeling. Among the best of his ideal works are "Morpheus" and "St. John the Baptist" (Cardiff Gallery); "The Elf" (Glasgow Gallery); "Boy at Play" (Tate Gallery); "Study of a Head" (Liverpool Gallery). His portraits, which are faithful likenesses, include the seated statue of the Duke of Devonshire, at Eastbourne; King Edward VII, at Cape Town; Prince Christian Victor, at Windsor; the historian Lecky, at Trinity College, Dublin, and an equestrian statue of the Earl of Minto, at Calcutta. Among his memorial monuments are those to the Marquis of Salisbury, in Westminster Abbey and Hatfield Church; to Sir Arthur Sullivan, in St. Paul's Cathedral, and to the Coldstream Guards and War Correspondents, also in St. Paul's. John received a gold medal in Paris in 1901, was made a Royal Academician in 1909, was knighted in 1911, and became corresponding member of the French Institute.

JOHN A. GRINDLE, or Johnny Grindle. A quaint name in the Mississippi valley for the curious fish the bowfin (*Amia calva*), also called lawyer. See Bowfin.

JOHN ANDERSON, MY JO. 1. A touching ballad by Robert Burns. 2. An old Scottish song, a dialogue between a man and his wife ridiculing popery.

JOHN BROWN'S BODY. One of the most frequently sung marching songs of the Civil War. The melody is said to have been heard in a Southern colored church and fitted to the words, "Say, brothers, will you meet us?" at a meeting of the Young Men's Christian Association held at Albany about 1860. The music was set to the words of the first stanza by James E. Greenleaf, and the other stanzas were written by C. S. Hall, of Charlestown, Mass., in 1861. Consult H. K. Johnson, *Our Familiar Songs and Those who Made Them* (New York, 1881).

JOHN B. STETSON UNIVERSITY. A coeducational institution founded at De Land, Fla., in 1887. It has a preparatory department, a college of liberal arts, schools of law, technology, music, and art, a normal school, and a business college. It confers the degrees of bachelor of arts, philosophy, science, and laws, and of mechanical, civil, and electrical engineer. The university has a campus of 35 acres and well-equipped modern buildings, in large part the gifts of John B. Stetson, valued at $300,000. Its endowment funds amounted in 1914 to over $1,000,000, and its income to $40,000. It has a library of more than 24,000 volumes. In 1913–14 its students numbered 469, of whom 224 were enrolled in the collegiate department. The number of professors and instructors was 37. The president in 1914 was Lincoln Hulley, Ph.D., LL.D.

JOHN BULL. See National Nicknames.

JOHN BULL; or, The Englishman's Fireside. A comedy by the younger Colman (1805).

JOHN CASIMIR (1543–92). Count Palatine of the Rhine, the fourth son of Elector Palatine Frederick III, born in Simmern. He was reared at the French and Lotharingian courts, and joined the Calvinist church at the same time as his father. He at various times (1575–78) led troops into France to aid the Huguenots and into the Netherlands to aid the Dutch, but achieved little fame as a soldier. On the death of his brother he became Regent of the Palatinate during his nephew's minority and made his Protestant subjects adopt the Calvinist creed—the third time in 10 years they had been forced to change.

JOHN CHINAMAN. See National Nicknames.

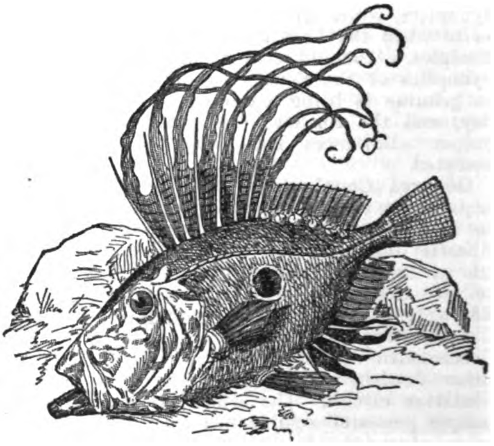
JOHN COMPANY. A nickname for the East India Company, originating probably in India, in the eighteenth century.

JOHN CRESCENTIUS. See Crescentius, John.

JOHN CROW. The name in Jamaica and the British Antilles for the turkey buzzard vulture (*Cathartes aura*).

JOHN DAMASCENE. See John of Damascus.

JOHN DORY. The English name of a small group of singular fishes found in the warm seas of the Old World. One species (*Zeus faber*) is well known in the Mediterranean as a food fish, but is uncommon in the Atlantic. Its ugly and extraordinary form is shown in the accompanying illustration. The body is greatly compressed, and the total length rarely exceeds 20 inches. The bony jaws can be widely opened, so that surprisingly large objects may be swallowed, and the fish is active in pursuit of its prey (other fishes), though sluggish at other times. Its body scales are very small, but it is armed with strong fin spines and has a row of large spinous scales along the base of the dorsal fin and in front of the pectorals. The color is usually a pale olive brown, with a large circular spot nearly black on the middle of the side. Various legends account for this spot. One declares this to be the fish which St. Peter caught in the Lake of Gennesaret and marked with his thumb and finger while taking the tribute money from its mouth; another that the mark was similarly made by St. Christopher, who seized one of these fishes while carrying Jesus through an



JOHN DORY.

arm of the sea. Its flesh is highly esteemed in Europe. Several related species occur in the deeper tropical seas, and all constitute a group of very uncertain affinities.

JOHN FREDERICK I, the Magnanimous (1503–54). Elector of Saxony from 1532 to 1547. He was the son of the Elector John the Constant and was born at Torgau, June 30, 1503. In 1532 he succeeded his father in the government conjointly with his brother Ernest, with whom, however, he concluded a partition settlement in 1542, ceding to him the Principality of Coburg. He was from the first an ardent champion of the Reformed faith. With Philip of Hesse he became one of the leaders of the Schmalkaldic League (q.v.), and as such was placed by Charles V under the ban of the Empire in 1546. He successfully defended his territories against an invasion by his cousin, Maurice of Saxony, in the same year; but on April 24, 1547, the army of the Schmalkaldic League was defeated at Mühlberg, and John Frederick fell into the hands of the Emperor. Sentence of death was pronounced on the prisoner, and he was compelled to cede his possessions, together with the electoral title, to Maurice. For five years John Frederick remained in captivity, until, together with Philip of Hesse, he was liberated by the sudden uprising of Maurice against Charles V. The death of his brother Ernest in the same year (1552) placed him in possession of Coburg. He died in 1554. The foundation of the University of Jena was largely due to his patronage.

JOHN FREDERICK II (1529–95). Duke of Saxony, eldest son of John Frederick I. After his father's imprisonment, in 1547, he undertook, in conjunction with his brother John William and in the name of their younger brother John Frederick III, the administration of what remained of the territories of the Ernestine line. Soon after, in accordance with his father's wish, he founded the University of Jena. Upon the death of John Frederick III, in 1565, the two brothers divided their dominions, John Frederick taking Weimar and Gotha, and John William Coburg, who, in 1567, became sole ruler. In 1566, because of the protection which he had afforded the outlaw Wilhelm von Grumbach, he was himself outlawed by the Emperor, was captured in 1567, and was imprisoned until his death. His wife, Elizabeth of the Palatinate, lived with him during 22 years of his imprisonment. Consult Beck, *Johann Friedrich der Mittlere* (Weimar, 1858).

JOHN GEORGE I (1585–1656). Elector of Saxony from 1611 to 1656. He was born March 5, 1585; married Magdalene Sibylle, daughter of Duke Albert Frederick of Prussia, in 1607; and succeeded his brother Christian II as Elector of Saxony, June 23, 1611. The attitude of Saxony, as one of the most powerful of the Protestant states of Germany, was of great importance in the Thirty Years' War; but the course of John George was vacillating, and when he was giving nominal support to one side, he was generally negotiating with the other. When Gustavus Adolphus entered Germany, John George refused him passage across Saxony, and thus prevented the relief of Magdeburg, which was taken by Tilly, whose infuriated troops put most of the inhabitants to the sword. A little later, when Saxony was about to suffer from the advance of the Imperialists, John George concluded a hasty alliance with Sweden, and his troops were on the field of Leipzig or Breitenfeld (September, 1631), but fled early in the day. The Elector sought continually to bring about a peace advantageous to Saxony. In 1632, when Gustavus was in Bavaria, he sought to detach Brandenburg from the Swedish cause, and in 1635 he concluded the Peace of Prague with the Emperor, yielding practically all that the German Protestants had fought for and agreeing to endeavor to secure the general acceptance of the terms. His reward was the hereditary possession of Lusatia. Only Brandenburg and some of the minor states acceded. In 1636 the Saxons were defeated by Banér at Wittstock, and in 1645 the Elector was obliged to conclude an armistice with Sweden. By the Peace of Westphalia he was confirmed in the possession of Lusatia and the bishoprics of Meissen, Merseburg, and Naumburg. John George died Oct. 8, 1656. How much of his changeable and treacherous policy was due to himself, and how much to the intrigues of his most trusted counselor, Von Arnim, it is difficult to determine. His will established three ruling Saxon lines for his sons, in addition to electoral Saxony—Saxe-Weisenfels, Saxe-Merseburg, and Saxe-Zeitz. See Arnim; Gustavus Adolphus; Saxony; Thirty Years' War.

JOHN GEORGE II (1613–80). Elector of Saxony from 1656 to 1680. He was the son of John George I and was born in 1613. Subsidies received from France in the early years of his reign (against the will of a majority of his subjects) enabled him to gratify his tastes, which were more to him than his crown, and to make Dresden one of the most beautiful cities and art centres of Europe.

JOHN GEORGE III (1647–91). Elector of Saxony from 1680 to 1691, only son and successor of John George II. He took a prominent part in the war between the Empire and Louis XIV of France, which broke out in 1688, and in 1690 was made commander of the Imperial army. One of his sons became King of Poland.

JOHN GEORGE IV (1668–94). Elector of Saxony from 1691 to 1694, son and successor of John George III. He continued the policy of his father during his short reign of three years, maintaining an alliance with Brandenburg and the Emperor, although he maintained an independent attitude towards the latter, which frequently resulted in trouble. As a matter of state policy he married Eleonore, Margravine of Brandenburg-Anspach, but his life is chiefly interesting for the story of his romantic attachment for Magdalene Sibylle von Neitschütz, who was created Countess of Rochlitz by the Emperor.

JOHN GILPIN. The hero of a famous humorous ballad of the same title by William Cowper (1782).

JOHN HALIFAX, GENTLEMAN. A novel by Dinah Mulock Craik (1856).

JOHN HYRCANUS. See Hyrcanus.

JOHNITE. See Explosives.

JOHN MARCH, SOUTHERNER. A novel by G. W. Cable (1894). It appeared as a serial in *Scribner's Magazine.*

JOHN NE'POMUK SALVA'TOR, Archduke of Austria (1852–?1891). He was born in Florence, the youngest son of the Grand Duke Leopold II of Tuscany. He entered the Austrian military service and rose through the various ranks to that of major general commanding a division. In 1883 he was transferred to Linz as a punishment for having published a pamphlet entitled *Drill oder Erziehung?* in which he expressed himself too sharply in opposition to the commander in chief, Archduke Albert. The government was still more irritated when he, as it was asserted, intrigued to have himself appointed successor to Prince Alexander of Bulgaria, on the latter's enforced abdication. Soon after this he was deprived of his military command and left the army. He then studied navigation, passed the examination for ship's captain, and in October, 1889, after having renounced all his titles, rights, and privileges as an archduke, took the name of Johann Orth (from the name of his castle). The next summer he left Hamburg for Buenos Aires, on board his newly purchased sailing ship *Sankt Margaretha*. After touching at Buenos Aires, he continued his voyage in the direction of Valparaiso and never was heard from again. Numerous romantic stories have been told in connection with his strange disappearance, but the probability is that the *Sankt Margaretha* was wrecked on the coast of South America, and that all hands were lost. Besides his pamphlet already mentioned, he left two others on military subjects, *Betrachtungen über die Organisation der österreichischen Artillerie* (1875) and *Geschichte des kaiserlich-königlichen Linien-Infanterieregiments Erzherzog Wilhelm Nr. 12* (1877–80), and a third on spiritualism, entitled *Einblicke in den Spiritismus* (5th ed., 1885). In addition to these he wrote the text of the ballet *Die Assassinen*.

JOHN'NY (Jean) **CRAPAUD**, krȧ'pō'. A Frenchman. See National Nicknames.

JOHNNY DARTER. A fish. See Darter.

JOHNNY GROAT'S HOUSE. See John o' Groat's House.

JOHNNY REB. A nickname used of the Southern soldiers by the Federal troops during the Civil War.

JOHNNY VERDE, or Juan Verde. A numerous and excellent food fish (*Paralabrax nebulifer*) of the southern California coast. It is one of the cabrillas, about 18 inches long, mottled greenish in color, and has the general characteristics of a rock bass.

JOHN O' GROAT'S HOUSE (more correctly, Johnny Groat's House). A spot on Duncansby Head, the northeastern extremity of the mainland of Scotland, marking one of the limits of that country. Commemorated in Burns's line, "Frae Maidenkirk to Johnny Groat's," it is also widely known as the terminus of cycling and automobile record rides from Land's End, the southwestern extremity of England, a distance of 994 miles. The house stood on the beach at the mouth of the Pentland Firth and was probably built for the reception of travelers crossing the ferry to the Orkneys. Tradition gives a romantic origin. In the reign of King James IV (1488–1513) two or three brothers—Dutchmen named Groot or Scotch Lowlanders named Groat—settled in Caithness and acquired the lands of Warse and Dungansby. When their descendants had multiplied to eight families, disputes arose as to precedency at a yearly festival reunion. John Groat, one of the brothers, settled the controversy by building an eight-sided house, with a door and a window in each side, and an eight-sided table within, so that the head of each of the eight families of Groats might enter by his own door and sit at his own head of the table. The family of Groats still exists, but a small green knoll marked with the foundation lines is all that remains of John o' Groat's house. A neighboring hotel with an appropriate octagonal tower bears the name since 1876. The beautiful shell *Cypræa europæa*, which abounds in the neighborhood, is known as John o' Groat's bucky.

JOHNS, Claude Hermann Walter (1857–). An English Assyriologist, born in Banwell, Somersetshire. He was educated at Queens' College, Cambridge; was ordained in 1887 after being a secondary-school teacher for seven years; was tutor at St. Peter's, Peterborough, in 1887–92; held the post of lecturer in Assyriology at Queens' College, Cambridge (1895–1909), and at King's College, London (1904–10); and in 1909 became master of St. Catharine's, Cambridge, and canon of Norwich. In his special field of Babylonian law he published: ***Assyrian Deeds and Documents of the Seventh Century B.C.*** (1898–1902); ***The Oldest Code of Laws*** (1903); ***Babylonian and Assyrian Laws, Contracts, and Letters*** (1904).

JOHNS HOPKINS UNIVERSITY. An institution of higher learning in Baltimore, Md., founded by Johns Hopkins (q.v.), who bequeathed over $7,000,000 for the establishment of a university and a hospital. The two institutions are closely affiliated, but each has its own funds and is controlled by a distinct board of trustees. The university was incorporated Aug. 24, 1867, several years before the founder's death, and in 1870 the first board of trustees was created. Early in 1874 the trustees began the work of organization and at the end of that year elected, as president, Dr. Daniel Coit Gilman, who entered upon his duties in February, 1876. Instruction in the department of philosophy began in October of the same year. Temporary buildings were provided in the heart of the city, and the location proved to be so convenient that the university has remained there. In May, 1889, the Johns Hopkins Hospital was opened, and the work of the Johns Hopkins Medical School was inaugurated in 1893. In 1902 a gift of an eligible site in the suburbs of Baltimore was made, and an endowment of $1,000,000 was presented to the university by the citizens of Baltimore. The development of this site was at once undertaken. A botanical laboratory and a greenhouse have been erected, and a fine athletic field is in use by the students. A general scheme of arrangement of the future buildings was adopted by the trustees as the result of a competition by selected architects, and the plans of the important structures were in 1914 either completed or in course of preparation. The academic building and a mechanical and electrical engineering building were occupied in 1914.

The university offers instruction to students of the following classes: 1. Under the faculty of philosophy: (*a*) college graduates and other advanced scholars (men and women) who may proceed to the degree of doctor of philosophy or of master of arts in literature or science, or pursue their studies for any length of time at their own discretion; (*b*) undergraduate students (men only) who are candidates for the degree of bachelor of arts: these may pursue one of five parallel groups of studies; (*c*) students who have taken no degree and who desire to pursue work in the university without aiming at academic honors. 2. Under the faculty of medicine: (*a*) candidates for the degree of doctor of medicine (men and women) for whom a four years' course is provided; (*b*) doctors of medicine desiring to pursue special graduate courses. 3. In the department of engineering: graduates or undergraduates (men only) looking forward to the profession of engineer. The undergraduate college was organized to meet the needs of those desiring "a systematic discipline in liberal studies," and since 1876 over 2300 students have received the collegiate training. The undergraduate work is rendered effective by certain features of organization not found to the same degree elsewhere. These conditions include the sharp distinction drawn between the disciplinary methods appropriate for undergraduate instruction and the freer methods of advanced study; the group arrangement of studies; the opportunities offered to students of exceptional attainments for carrying on work beyond that required for any degree; and the influence upon younger pupils of the presence of a large body of graduate scholars engaged in specialized work in the various branches of learning. The most striking characteristics of the Johns Hopkins University, however, are the attractions offered to advanced students and the instruction given to them in seminaries and laboratories. These features were made the prime consideration at the inception of the university, at a time when the importance of university work did not receive its full measure of recognition in the United States. The first president succeeded in associating with him a small number of eminent specialists whose high standards and enthusiasm carried the new institution successfully through its experimental period and earned for it primacy in its field. For the encouragement of research among American students, the university annually awards a large number of fellowships and scholarships. Under the auspices of the university are published the *American Journal of Philology*, the *American Journal of Mathematics*, *Memoirs from the Biological Laboratory*, the *Studies in Historical and Political Science*, *Modern Language Notes*, *Hesperia* (devoted to Germanic philology), *Contributions to Assyriology and Comparative Semitic Philology*, and *Terrestrial Magnetism and Atmospheric Electricity*.

The government of the university is vested in a board of 12 trustees, with the president as an ex-officio member. In the philosophical department an academic council, consisting of the president and 10 professors, is in charge of the various departments of study and exercises the right of nominating the instructors and fellows. A board of university studies, consisting of the president, 37 professors, and 14 associate professors, has charge of the instruction of graduate students and of the examination of candidates for the degree of doctor of philosophy or of master of arts. A board of collegiate studies, consisting of the president, the dean of the college, and representatives from each of the chief departments of undergraduate study, directs the college work and conducts examinations for the baccalaureate degree. The Medical School, which is a department of the university and is at the same time closely connected with the Johns Hopkins Hospital, has had a most important influence on the recent advances made in medical education. The course extends through four years. For admission the bachelor's degree is required, or an equivalent course of preliminary training in the liberal arts, and especially in three branches of science—physics, chemistry, and biology. The principal buildings of the philosophical department are McCoy Hall, which contains the library, the chief assembly room, and numerous apartments for literary and historical studies; Levering Hall, devoted to the work of the Young Men's Christian Association; Hopkins Hall, devoted to geology and mineralogy; the Chemical Laboratory; the Biological Laboratory; the Physical Laboratory; the Gymnasium; and the Administration Building. The medical department is provided with five well-equipped laboratories: the Anatomical (known as the Women's Fund Memorial Building), the Physiological, the Pathological, the Clinical, and the Hunterian (for animal surgery). In 1913 the total value of the property under control of the university was $2,312,108, the endowment $5,969,000, and the gross income $377,689. The university has at various times received generous gifts, including one of $307,000 from Miss Mary E. Garrett, of Baltimore, supplementing a previous gift of $112,000 from women in different parts of the country, which enabled the trustees to open the Medical School (1893). Two general subscriptions for the benefit of the university have been made in Baltimore, amounting to nearly $350,000, in addition to the million-dollar endowment fund above referred to. In 1910 the General Education Board offered the sum of $250,000 if the university would secure an additional $750,000 within a specified period—half of the total to be available for buildings on the new site. The sum was oversubscribed within a few months by citizens of Baltimore and other friends. In 1912 the Legislature of Maryland appropriated $600,000 to establish a department of engineering, this sum to be used for buildings and equipment, and by the same Act an annual grant of $50,000 for maintenance was made. For two years the Legislature gave $50,000 per annum, $24,000 annually for the next two years, and $25,000 annually for the past 12 years, for current expenses.

The library contained, in 1914, 182,000 volumes, and more than 2300 periodicals are regularly received. The library supplements the valuable collections of the Peabody Institute, containing 211,000 volumes. The Maryland Geological Survey and the Maryland Weather Bureau are closely connected with the university, occupying rooms in the university buildings. In 1913–14 the faculty included 240 professors, associates, instructors, assistants, and lecturers. In the same year there were 870 students in the regular session, of whom 213 pursued graduate courses under the philosophical faculty, 378 under the medical faculty, and 16 in the department of engineering, and 263 were enrolled in the undergraduate courses, including those expecting to study engineering. In addition 167 teachers and others attended specially arranged afternoon courses of collegiate grade, 70 physicians pursued special courses in medicine and surgery, and 277 were enrolled in college courses during six weeks of summer. The total enrollment, excluding duplicates, was 1325. Dr. Gilman resigned the presidency in 1900, the resignation taking effect at the end of the academic year. Professor Ira Remsen was chosen to succeed him, and he was inaugurated Feb. 22, 1902; in January, 1913, he retired from office. On Feb. 23, 1914, the trustees announced the election of Dr. Frank Johnson Goodnow, of Columbia University, as president, and he assumed his duties Oct. 1, 1914. Consult: *Johns Hopkins University: The Foundation and the Founder* (Baltimore, n. d.); *Retrospect of Twenty Years, 1876–1896* ((ib., n. d.); *Statements Respecting the University Presented to the Public on the 20th Anniversary* (ib., n. d.); D. C. Gilman, *Launching of a University and Other Papers* (New York, 1906); E. E. Slosson, *Great American Universities* (ib., 1910).

JOHN SIGISMUND, sĭj′ĭs-mŭnd, *Ger. pron.* zē′gĭs-mụnt (1572–1620). Elector of Brandenburg, son of the Elector Joachim Frederick. During his reign the dominions of the electors of Brandenburg were increased by the acquisition of Cleves, Mark, Ravensberg, Ravenstein, and the Duchy of Prussia (East Prussia). The first four districts were part of the dominions of the dukes of Cleves, Jülich, and Berg, all of which the Elector claimed as grandson of the eldest daughter of Duke William the Rich. Count Palatine of Neuberg, the husband of a younger daughter, also claimed the territories. After years of dispute the matter was finally arranged in 1630 by an amicable division of the districts. The acquisition of East Prussia was also accompanied by difficulties, notwithstanding the Polish King's promise that the Brandenburg Hohenzollerns should be the heirs of the Prussian dukes. The Prussian nobles preferred the freedom enjoyed by their Slavic neighbors to what they called "the Brandenburg tyranny," and the King of Poland was not unwilling to listen to their petition, so that it was only by giving the greatest concessions that the Elector finally persuaded the King to stand by his promise.

JOHNSON, Alexander (1835–1913). A Canadian educator and scientist. He was born in Ireland and was educated at Trinity College, Dublin. He came to Canada in 1857 and was appointed professor of mathematics and natural philosophy, and later Peter Redpath professor of pure mathematics, in McGill University, Montreal. In 1867 he became vice dean and, later, dean of the faculty of arts and vice principal of the university. He was acting principal for three years and in 1903–13 was vice principal emeritus. Johnson contributed valuable papers to the *Transactions* of the Royal Society of Canada, of which he was president in 1905, and he also read papers before the British Association for the Advancement of Science. In 1897 he was vice president of the mathematical and physical section of the latter association. He was chairman and secretary of its committee which established a tidal survey for Canada and later was prominent in securing the commencement of a general hydrographic survey of the Atlantic and Pacific coasts. Besides many pamphlets and papers he published *Science and Religion* (1876).

JOHNSON, Alvin Jewett (1827–84). An American publisher, born at Wallingford, Vt. He spent his early years on a farm, then went to Virginia, where he taught school for a time, and finally removed to New York in 1853. The most important of his publications was *Johnson's Universal Cyclopædia*, the publication of which involved him in a bitter dispute with D. Appleton & Co., who afterward bought it and published it as the *Universal Cyclopædia*.

JOHNSON, Alvin Saunders (1874–). An American economist. Born near Homer, Neb., he graduated in 1897 from the university of that State, and in 1902 from Columbia University (Ph.D.), where he was tutor, instructor, and adjunct professor of economics until 1906. He served as professor of economics at the University of Nebraska in 1906–08 and at the University of Texas in 1908–10; was acting associate professor in 1909, and associate professor in 1910–11, at the University of Chicago; and held the chair of economics at Leland Stanford in 1911–12 and at Cornell after 1913. He was assistant editor of the *Political Science Quarterly* in 1902–06 and had charge of the department of economics in the New International Encyclopædia, and is author of *Rent in Modern Economic Theory* (1903), *Introduction to Economics* (1909), and *The Professor and the Petticoat* (1914), a novel.

JOHNSON, Andrew (1808–75). The seventeenth President of the United States of America. He was born at Raleigh, N. C., Dec. 29, 1808. His father lived only four years after Andrew's birth and left no funds for the education of the boy, who at the age of 10 was bound out to a tailor. Lack of education was a great grievance to Andrew, and he resolved to learn to read by himself. For this purpose he passed much of the time between labor and sleep in study. Just before his term of service was out, he went to work on his own account as a journeyman tailor at Laurens Court House, S. C. In 1826 he removed to Greeneville in east Tennessee, where he worked at his trade for about a year and married Eliza McCardle, who taught him writing and arithmetic.

When only 20 years old, Johnson organized a party of workingmen in opposition to the planters. The workingmen chose him alderman that year and reëlected him in the two succeeding years. In 1830 Johnson was elected mayor, serving for three years. To qualify himself for public undertakings, he joined a debating society, most of whose members were students of Greeneville College. In 1834 Johnson took an active part in advocating a new constitution for the State greatly limiting the power of the large landholders; in 1835 he nominated himself for the Assembly, declaring himself a Democrat. He was successful in the ensuing election, but in 1837 failed of reëlection because of his opposition to a financial measure which, as was later proved, he rightly judged to be bad. In 1839 he was again chosen a member of the Legislature. In 1840 he was on the Democratic electoral ticket and made many speeches for Van Buren. The next year he was elected to the State Senate, and in 1843 he was elected a member of Congress, to which he secured four consecutive reëlections. While in the House he supported the annexation of Texas, the Mexican War, the Tariff of 1846, and the Compromise of 1850. He favored the acceptance of the forty-ninth degree of latitude to settle the Oregon boundary dispute and was one of the foremost of the advocates of a homestead law. He was also a firm supporter of the President's veto power and on all occasions was in favor of the greatest economy in public expenditure. Having been gerrymandered out of a seat, he left Congress in March, 1853; but the same year he was chosen Governor of his State, and two years afterward was reëlected after a very turbulent canvass.

In 1857 he was elected to the United States Senate, where he opposed the increase of the army and the legislation for the Pacific Railroad. He spoke little on slavery except to discourage all agitation of the question, his main interest being centred on the preservation of the Union. In the campaign of 1860, after being himself mentioned for the nomination, he supported Breckenridge until he found that secession was contemplated, when he repudiated him. When he went home in 1861, after opposing secession in the Senate, he was in great danger of his life. He worked hard for the Union cause, and at one time the secessionists turned his family out of their home. Early in March, 1862, Johnson was made military Governor of Tennessee. For a long time he labored earnestly to bring his State back into the Union. Near the beginning of March, 1864, under Johnson's special orders, Tennessee elected officers, both State and local. Three months afterward he was nominated for Vice President on the ticket with Lincoln. Six weeks after the inauguration Lincoln was shot, and Johnson became President. On taking the executive chair he made a brief speech, which was understood to mean that he would deal with the utmost severity with the leading secessionists. Instead of following this policy, his course, after he came under the influence of Secretary Seward, was the very opposite. He hastened to bring Virginia back to the Union, and near the close of June he brushed aside all regulations with regard to trade with the seceding States. He proclaimed general amnesty to all (except a few special classes) who would swear to be loyal to the Union. Under his proclamation provincial governments were set up in a number of the States but a few weeks before in rebellion, and he prepared the way for them to send members to Congress. These acts put him in opposition to the majority of the Republicans in Congress. Congress appointed a committee on reconstruction and on the admission of Southern members to the House, and adopted the Civil Rights Act, adding an act to increase the power and efficiency of the Freedmen's Bureau. These last two bills were vetoed by President Johnson, but they were readopted and passed. This action was severely denounced by the President, who characterized the course of Congress as another rebellion. Disaffection began to work in the cabinet, and three members resigned in consequence of differences with the President.

When Congress declared that the Fourteenth Amendment, giving the negroes citizenship, should be ratified by every seceding State as a preliminary to readmission to the Union, the President vetoed the resolution. During the next session acts were passed requiring the right of voting to be granted without regard to color in Territories applying for admission as States. These, too, were vetoed; but in all cases the bills were repassed and became laws. In March, 1867, in spite of the veto, an Act was passed dividing the Southern States, save Tennessee, into military districts, and trouble immediately arose over the appointments of the generals to command and their functions, Johnson's cabinet, with the exception of Secretary Stanton, supporting him in his obstruction of the legislation of the radicals in Congress. In August Stanton was displaced as Secretary of War, and General Grant was given the position. Stanton protested that his removal was in violation of the Tenure of Office Law which Congress had passed over Johnson's veto in March, 1867; and at the meeting of Congress in September the Senate refused to ratify the suspension, whereupon Grant resigned, and Stanton resumed his post. Five months afterward Johnson again removed Stanton, and put Gen. Lorenzo Thomas in his place. But Congress had taken from the President practically all power, and the Senate now resolved that "the President has no power to remove the Secretary of War and designate any other person to perform the duties of that office." The day after the adoption of the resolutions of the Senate, the House of Representatives determined upon the President's impeachment. The articles of impeachment recited many offenses, the principal of which were the removal of the Secretary of War; the public expression of disregard of and contempt for the legislative branch of the government; the declaration that the one in session was not a constitutional Congress; and particularly his obstruction to the execution of congressional acts. The main point of the defense was that Johnson's course in the work of reconstruction was merely the continuation of a plan resolved upon by President Lincoln and the members of his cabinet. In the Senate, sitting as the court of impeachment, the test vote was: guilty, 35; not guilty, 19. The requisite two-thirds vote not having been obtained, Johnson was acquitted—a result which is now considered just and fortunate by temperate historians. As soon as the trial was over Stanton voluntarily gave up his office and was succeeded by General Schofield.

At the Democratic National Convention in New York, July 4, 1868, Mr. Johnson's name was among the list of candidates for President. On the first ballot he had 65 votes, standing second on the list, George H. Pendleton having 105; but Johnson's vote diminished rapidly until on the nineteenth ballot his name did not appear. On Christmas Day, 1868, he proclaimed complete pardon to all who had been directly or indirectly concerned in secession. This was his last important official act. He was succeeded, March 4, 1869, by General Grant and at once repaired to his home in Greeneville. He was not satisfied with retirement and sought unsuccessfully to be sent to the Senate and also failed as an independent candidate for Congress. At last, in January, 1875, he was chosen United States Senator and was in his seat during the short extra session in March. But his triumph was short, for he died on July 31, 1875. Johnson showed great ability, courage, and political acumen. His messages, which represent his views, whether or not he was their author in the fullest sense, are powerful documents. His bust is in the Senate gallery in the Capitol at Washington.

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Reconstruction, Political and Economic (ib., 1907); id., "A Little More Light on Andrew Johnson," in the *Proceedings of the Massachusetts Historical Society* (Boston, 1905), in which the author maintains that Johnson's first inaugural address was written by the historian George Bancroft.

JOHNSON, Bradley Tyler (1829–1903). An American soldier and lawyer, born at Frederick City, Md. He graduated at Princeton in 1849, studied law at Harvard, and was admitted to the bar in 1851. He was a delegate to the National Democratic Convention at Baltimore in 1860 and joined the majority of his delegation when they withdrew from the convention and united with the Southern wing of the party, which supported Breckenridge and Lane. When the Civil War began, Johnson organized and equipped a company at his own expense, and he took an active part in forming the First Maryland Regiment, of which he became major and subsequently colonel, meanwhile declining a lieutenant colonel's commission in a Virginia regiment because of his belief that his strongest obligation was to his own State. He saw service in the seven days' battles around Richmond in 1862 and was advanced to the rank of brigadier general of cavalry in 1864. As commander of the post at Salisbury, N. C., he used his influence to lessen the suffering among the prisoners and finally obtained their parole. At the close of the war he practiced law in Richmond until 1879, when he removed to Baltimore. His writings include: *Reports of Chase's Decisions on the Fourth Circuit* (1875); *Memoir of Joseph E. Johnston* (1891); an examination of the *Foundation of Maryland and the Maryland Act Concerning Religion* (1883); *Life of General Washington*, in "Great Commanders Series" (1894); and the volume *Maryland in Confederate Military History* (Atlanta, 1899). Consult vol. ii of this *History* for Johnson himself.

JOHNSON, Burges (1877–). An American author, editor, and publisher, born at Rutland, Vt. Graduating from Amherst College in 1899, he served as a reporter for the New York *Commercial Advertiser* and the *Evening Post* in the same year; was literary adviser to G. P. Putnam's Sons in 1900–02 and a member of the literary staff of Harper & Bros. in 1903–06; and then held an assistant editorship on *Everybody's Magazine* for a year and the managing editorship of *Outing* until in 1908 he became president of the publishing house of Thompson, Brown Co. After 1913 he was manager of the educational department of E. P. Dutton & Co. He is author of *Rhymes of Little Boys* (1905); *Pleasant Tragedies of Childhood* (1905); *Beastly Rhymes* (1906); *Rhymes of Home* (1909); *Yearbook of Humor* (1910); *Bashful Ballads* (1911); *Rhymes of Little Folks* (1915).

JOHNSON, Bushrod Rust (1817–80). An American soldier in the Confederate service, born in Belmont Co., Ohio. He graduated at West Point in 1840 and served in the Seminole War and in the war with Mexico. He resigned from the service in 1847, was professor of natural philosophy and chemistry at the Western Military Institute, Georgetown, Ky., in 1848–51, and then for four years superintendent of the institution. In 1855 he became superintendent of the Military College of the University of Nashville. He entered the Confederate Army as a colonel of engineers in 1861 and was made a brigadier general in January, 1862. He was chief of staff at the defense of Fort Donelson and two months later commanded a brigade at Shiloh (April 6 and 7, 1862). At Perryville and at Murfreesboro his brigade was engaged in some of the most desperate fighting, while at Chickamauga, according to Gen. D. H. Hill, it was due to Johnson's initiative that the Confederates swept the Federal right wing from the field. He was commissioned a major general in May, 1864. Towards the close of the war his force joined Lee's army and took part in the actions at Drewry's Bluff and around Petersburg. After the surrender he returned to the Western Military Institute, where he was professor of engineering, mechanics, and natural philosophy during the remainder of his life.

JOHNSON, Cave (1793–1866). An American politician. He was born in Robertson Co., Tenn., received an academic education, studied law, was admitted to the bar, and practiced successfully at Clarksville until his appointment to the bench of the State Circuit Court in 1820. He resigned his judgeship in 1829, upon his election as a Democrat to the Twenty-first Congress. By successive reëlections he served until 1837, when he was defeated by the Whig candidate, but was again elected in 1839 and continued to serve until 1845. He was a ready debater and a stanch supporter of Jackson and opposed with spirit the nullification movement and the United States Bank. In 1845 he entered the cabinet of President Polk as Postmaster-General, serving throughout the administration and favoring the President's Mexican policy, though with little enthusiasm. From 1850 to 1859 he was president of the State Bank of Tennessee and on the outbreak of the Civil War, although an old man, threw himself with energy into the movement to keep Tennessee in the Union, spoke frequently in opposition to secession, and supported and advised Andrew Johnson. In 1863 he was elected as a Unionist to the State Senate of Tennessee, but ill health prevented his taking any part in legislation.

JOHNSON, Charles (1679–1748). An English dramatist, born probably in London. He first studied for the bar, but afterward gave himself to authorship and produced 19 mediocre plays. Pope satirized him in the *Dunciad*. His works include: *The Wife's Relief, or the Husband's Cure* (1711); *Country Lasses, or the Custom of the Manor* (1715); *The Sultaness* (1717), a tragedy taken from the *Bajazet* of Racine; *Cœlia, or the Perjured Lover* (1733).

JOHNSON, Charles Fletcher (1859–). An American legislator. He was born at Winslow, Me., and received the degrees of A.M. in 1879 and LL.D. in 1911 from Bowdoin College. He was principal of schools at Machias, Me., in 1881–86, was then admitted to the Maine bar, and thereafter practiced law at Waterville, Me., where he served for a time as mayor. In 1892 and 1894 he was the Democratic candidate for Governor of Maine, attended the Democratic National Convention in 1904, and served in the Maine House of Representatives in 1905 and 1907. He was chosen United States Senator for the term 1911–17.

JOHNSON, Daniel (1629–75). An English buccaneer, born at Bristol. When 25 years old, he was sold as a slave in the West Indies by the Spaniards, who had taken the merchant vessel in which he was a sailor, but escaped in

1657 and became a rover of the high seas, revenging his wrongs wherever possible upon Spanish shipping and towns. His depredations were upon such a gigantic scale that $25,000 were offered for his capture, and it was at length accomplished by four ships to one. Johnson's wounds were many and dangerous, but the Spaniards waited till they were healed before executing him at Panama.

JOHNSON, Duncan Starr (1867–). An American botanist. He was born at Cromwell, Conn., and was educated at Wesleyan University (B.S., 1892), at Yale, at Johns Hopkins (Ph.D., 1897), and in Munich (1901). At Johns Hopkins he was assistant in botany (1898–99), associate (1899–1901), associate professor (1901–06), and professor after 1906; and he had charge of the work in botany from 1896 to 1900 and of cryptogamic botany from 1901 to 1911 at the Carnegie Institution station for experimental evolution, Cold Spring Harbor, Long Island. His investigations deal with the morphology of various groups, notably of the Marsiliaceæ (water ferns), Hepaticæ (liverworts), and dicotyledons. In the last-named group he gave special attention to the more primitive families, especially the Piperaceæ.

JOHNSON, Eastman (1824–1906). An American genre and portrait painter, born at Lovell, Me., July 29, 1824, and educated in the public schools of Augusta. When 18 years of age, he made several portraits in black and white. In 1845 he spent one year in Washington, D. C., painting the portraits of Daniel Webster and John Quincy Adams. In the three following years, during his residence in Boston, he painted the portraits of Longfellow and his family, of Emerson, and Hawthorne. In 1849 he went abroad, studying with Leutze and at the Royal Academy, Düsseldorf; then in Paris, Italy, and Holland. He spent five years at The Hague, painting with such success that he was offered the position of court painter to remain. His work there included the well-known pictures, "The Savoyard" and "The Card Players." He returned to the United States in 1856, spending one year in the Indian country on the shores of Lake Superior. In 1860 he settled in New York and was elected a member of the National Academy of Design in the same year. He appealed to popular taste, painting simple themes of real life with a sound and thorough technique, little influenced by the Düsseldorf school. His portraits are dignified and fine in characterization; his genre pictures are better than anything done before in the United States—the subjects are treated with a wholesome naturalism and a breadth of handling lacking in his portraits. Many of his works have been lithographed and engraved. Among his chief works are: "Spanish Woman" (1862); "Old Stage Coach" (1871); "Milton Dictating to his Daughters" (1875); "Cranberry Harvest" (1880); portraits of Presidents Cleveland and Harrison, of Theodore D. Woolsey, John D. Rockefeller, William H. Vanderbilt, Cornelius Vanderbilt, William Waldorf Astor, Mrs. Alexander Hamilton, Mrs. Augustus Belmont, and Mrs. Hamilton Fish. The Metropolitan Museum, New York, possesses two portraits by him ("Two Men" and Sanford R. Gifford) and "Corn Husking at Nantucket"; the New York Historical Society, his portrait of Augustus Schell; and the Public Library, New York, his famous "Old Kentucky Home" and two others.

JOHNSON, Edward (1599–1672). An American Colonial official and historical writer, born in Kent, England. He came to Massachusetts Bay with the party of Governor Winthrop in 1630 and engaged in trade with the Indians. In 1642 he was recorder of the meeting which organized the town and church of Woburn, Mass., and he served as recorder of the town until his death. With the exception of 1648, he yearly represented the town in the General Court from 1643 to 1671, being Speaker in 1655 and serving upon many important committees. He published anonymously a *History of New England from the English Planting in the Yeere 1628 Untill the Yeere 1652* (London, 1654), which is better known by the subtitle *The Wonder-working Providence of Zion's Saviour.* Much of the book was copied in the so-called *Gorges Tracts.* It is valuable for the minute account of civil and ecclesiastical procedure in the Bay Colony and was reprinted in *Massachusetts Historical Collection,* 2d series, vols. i, ii, iii, iv, vii, viii. There is also a facsimile edition, with an elaborate introduction by W. F. Poole (Andover, 1867).

JOHNSON, E(mily) Pauline (1862–1913). A Canadian poet. She was born at Chiefwood, on the Grand River Reserve, in Ontario. Her father was George Henry M. Johnson, chief of the Mohawk Indians; her mother, Emily S. Howells, a native of Bristol, England. She was educated by private tutors and at the Brantford Model School. In 1894 she visited England, where she published a collection of poems under the title *The White Wampum.* The volume gained wide attention because of the author's Indian blood and fresh passionate themes. Her later volumes of poems were *Canadian Born* (1903) and *Flint and Feathers* (1912). She also published *Legends of Vancouver* (1911) and two books of fiction, *The Moccasin Maker* (1912) and *Shagganappi* (1913). She died at Vancouver, B. C.

JOHNSON, Emory Richard (1864–). An American economist, born at Waupun, Wis. He graduated from the University of Wisconsin (1888) and in 1893 took his Ph.D. from the University of Pennsylvania, where, after teaching economics for three years at Haverford College, he became professor of transportation and commerce. As an expert on transportation problems, his services were obtained by the United States Industrial Commission (1899), the Census Bureau (1904–05), and the National Waterways Commission (1909). He was a member of the Isthmian Canal Commission (1899–1904) and in 1911 made a report to President Taft on the Panama Canal. In 1907 he arbitrated a dispute between the Southern Pacific and the Order of Railroad Telegraphers. He became director of the Philadelphia Bureau of Municipal Research. Besides editing the *Annals* of the American Academy of Political and Social Science after 1901, he collaborated in the preparation of an economic history of the United States for the Carnegie Institution and published: *Inland Waterways: Their Relation to Transportation* (1893); *American Railway Transportation* (1903; rev. ed., 1908); *Ocean and Inland Water Transportation* (1906); *Elements of Transportation* (1909); *Railroad Traffic and Rates* (2 vols., 1911); *Panama Canal Traffic and Tolls* (1912); *Measurement of Vessels for the Panama Canal* (1913); *The Panama Canal,* with others (1915).

JOHNSON, Gisle (Christian) (1822–94). A noted Norwegian Lutheran theologian and author, born at Fredrikshald. A descendant of two of Iceland's most esteemed families, he was educated at Christianssand and Christiania, continued his studies in Berlin, Leipzig, Erlangen, and Paris, and became docent in theology at the University of Christiania in 1849 and was professor from 1860 to his death. Notable for his wide experience and great learning, he exerted a far-reaching influence upon his students and upon the Lutheran church of Norway throughout his long life. He founded many benevolent and educational institutions, as Den norske Lutherstiftelse (1867); was (1847–90) coeditor of *Theologisk Tidsskrift*, founder and (1863–75) editor of *Luthersk Kirketidende;* and wrote many books and articles. Consult: Th. G. B. Odland, "Biografi af Gisle Johnson," in *79de Beretning om det norske Bibelselskab* (Christiania, 1894), and *Norsk Forfatter-Leksikon*, vol. iii (ib., 1892).

JOHNSON, Guy (c.1740–88). An English soldier, famous as an American Royalist. He was born in Ireland and saw service during the French and Indian War, first with the American provincials and later as a cavalry commander under General Amherst. He succeeded his uncle, Sir William Johnson, as Superintendent of Indian Affairs at the latter's death in 1774. At the outbreak of the Revolution his estates in central New York were confiscated by the Americans, and he was obliged to flee to Canada. There he interested himself in inciting the Mohawk Indians, under Joseph Brant, to attack the colonists. In 1783 he was dismissed from the service and five years later died in poverty in London.

JOHNSON, Herman Merrill (1815–68). An American educator. He was born at Butternuts, Otsego Co., N. Y., graduated at Wesleyan University in 1839, and entered the Methodist ministry in 1845. He was professor of ancient languages at St. Charles College, Missouri, from 1839 to 1842, when he was called to a similar position at Augusta College, Kentucky. In 1844 he became a professor in Ohio Wesleyan University and remained there for six years. He accepted the professorship of philosophy and English literature in Dickinson College in 1850 and in 1860 became its president. Dr. Johnson was a contributor to the *Methodist Quarterly Review*, but is best known by his edition of the *Clio* of Herodotus (1850) and his *Orientalia Antiquaria Herodoti.*

JOHNSON, Herrick (1832–1913). An American Presbyterian clergyman and educator. He was born near Fonda, N. Y., and graduated at Hamilton College in 1857 and at Auburn Theological Seminary in 1860. He was pastor of churches in Troy, N. Y., Pittsburgh, Philadelphia, and Chicago; was professor of homiletics and pastoral theology at Auburn Theological Seminary (1874–80); and from 1880 to 1905 was professor of homiletics in McCormick Theological Seminary. He was moderator of the General Assembly of the Presbyterian church in 1882 and became president of the Presbyterian Board of Education and Board of College Aid. His publications include: *Christianity's Challenge* (1881); *Plain Talks about the Theater* (1882); *Revivals* (1883); *Presbyterian Book of Forms* (1889); *From Love to Praise* (1903); *The Ideal Ministry* (1908).

JOHNSON, Herschel Vespasian (1812–80). An American jurist and political leader, born in Burke Co., Ga. He graduated at Franklin College in 1834, studied law and practiced at Augusta, and finally settled at Milledgeville in 1844. In 1843 he was nominated for Congress, but was defeated, and in the campaign of 1844 was a presidential elector. In 1848 he was appointed by the Governor to the seat in the United States Senate made vacant by the resignation of W. T. Colquitt, and in that body he strongly supported the administration's Mexican policy. From his entry into political life he had been a strong States' rights advocate, and in 1849 he was one of the signers of the "Southern Address." His views, however, underwent a radical change at this time, and he became one of the warmest supporters of Clay's scheme of compromise and thereafter allied himself with the Unionist element in the South. He was a judge of the Superior Court of Georgia from November, 1849, to 1853, and was Governor of the State from 1853 until 1857. His well-known conservatism led to his nomination in 1860 as the candidate of the Northern Democrats for Vice President on the ticket with Stephen A. Douglas. With Alexander H. Stephens (q.v.) he did his utmost to check the secession movement in Georgia, but he abided by the decision of the secession convention and threw in his fortune with the Confederacy. He was elected one of the senators from Georgia in the Second Confederate Congress in November, 1862, but early despaired of the cause of the South. He openly advocated peace in 1864, hailed the cessation of hostilities with delight, and in October, 1865, was president of the Georgia convention which repealed the ordinance of secession. On the readmission of Georgia he was, in January, 1866, elected United States Senator, but was not allowed to take his seat on account of war disabilities. In 1873 he was appointed to the bench of the State Superior Court, where he remained until his death.

JOHNSON, Hiram Warren (1866–). An American lawyer and public official, born at Sacramento, Cal. He received his academic and legal education at the University of California and was admitted to the bar in 1887. Although regarded as an able and efficient attorney, he did not become generally known to the people of the State until he participated in the trial of the San Francisco graft and boodling cases in 1906 and 1907. When Francis J. Heney was shot down in the court room, Johnson, as the assistant prosecuting attorney who was most familiar with the case, took his place and conducted the prosecution with great ability and success. The result was that Abe Ruef and his associates were convicted and sentenced to a term of imprisonment, and Johnson was regarded as one who had freed the city and the State of their power. He was selected in 1910 by the progressive element of the Republican party for the nomination for Governor. A bitter campaign of five months followed, but Johnson, employing as his chief political doctrine the sentence "The Southern Pacific Railroad must be kicked out of State politics," won the nomination, and after a severe contest he was elected over the Democratic nominee. He began his administration with the avowed intention of cleaning up the State and turning out officeholders who were inefficient and who were controlled by private interest. His first message to the Legislature urged many radical reforms, including the establishment of a railroad commission, the adoption of the short ballot, and the direct nomination of United States Senators so as to bind the choice of the Legislature to the nominee. He spoke throughout the State in favor of the adoption of an amendment to the State constitution providing for the initiative and referendum in matters of legislation and for the recall of elective officers, including judges. In 1912, at the Republican Convention in Chicago, he was a conspicuous figure. He opposed the candidacy of President Taft, condemned the admission of certain contested delegates, and, leaving the party with the other followers of Roosevelt, was named for the vice-presidency on the ticket of the new Progressive party. In 1913 he signed the Webb Anti-Alien Land Bill, which was passed by the California Legislature to restrict the rights of aliens, particularly Japanese, in that State, and during the controversy which the bill provoked between the United States and Japan he remained firm. Though criticized as insincere in his adherence to the principles of the Progressive party, and in spite of the fact that this party's hold on the country at large had greatly weakened, Johnson was reëlected Governor in 1914 by 188,500 plurality. See CALIFORNIA, *History;* and, for constitutional amendments during his first term, *Government.*

JOHNSON, SIR JOHN (1742-1830). An American Tory leader, the son of Sir William Johnson (q.v.), upon whose estate on the Mohawk River in New York he was born. He was educated at Albany and at New York and took part with his father in the French and Indian War. He was knighted in 1765 and in 1774 succeeded to the baronetcy which had been granted to his father. He retained a great deal of his father's remarkable influence over the Indians, and it was due to this and to the exertions of Joseph Brant (q.v.), Sir William's protégé, that the tribes of the Iroquois Nation, with the exception of the Oneidas and the Tuscaroras, allied themselves with the British at the outbreak of the Revolution. There was a strong Tory element in central New York, and this element Sir John undertook to rally about the standard of Great Britain, organizing the famous loyalist corps known as the Queen's Own American Regiment, or, more familiarly, as the Royal Greens, of which he himself became colonel. With these troops in July, 1777, he joined St. Leger at Oswego and took part in the siege of Fort Stanwix (q.v.) and the battle of Oriskany (q.v.) on August 6 following. Later in the same day on which Herkimer was repulsed in his attempt to raise the siege, a brilliant sortie of the fort's garrison under Marinus Willett compelled Johnson to withdraw across the Mohawk, leaving his camp and equipage in the hands of the Americans. The advance of Arnold to the relief of the fort and the defection of a large part of their Indian allies caused St. Leger and Johnson to abandon the siege on August 22 and retreat northward towards Oswego, thus rendering impossible the proposed coöperation with Burgoyne. During the next two years Johnson continued to direct operations in northern and central New York, and the succession of raids of the Butlers and Brant with their bands of Indians and Tories, resulting in the massacres in the Wyoming and Cherry valleys, forms one of the most unpleasant chapters of the American Revolution. When in the summer of 1779 Washington determined to put a stop to these outrages, he sent General Sullivan at the head of 5000 troops into the region. This force met Sir John Johnson and the Butlers at Newtown (now Elmira) on Aug. 29, 1779, and decisively defeated them. This defeat and the devastation of the Iroquois towns that followed put a stop to the Tory régime in the district, and Sir John retired to Montreal. At the close of the war his large estates were confiscated. He lived the rest of his life in Canada, where for many years he was superintendent general of Indian affairs in British North America. Consult Stone, *Life of Brant* (New York, 1838; Albany, 1865).

JOHNSON, JOHN ALBERT (1861-1909). An American public official, born near St. Peter, Minn. When Johnson was only 13 years old, his father died in the county poorhouse of alcoholic dementia, and he was forced to leave school in order to support his mother. He was employed by various mercantile establishments and for a time was connected with a railroad-construction gang. During all of this time, however, he continued to educate himself by private study. His success in this respect was demonstrated in 1886 when he was made editor of the St. Peter *Herald.* He was active in bringing about civic improvements, providing free public lectures, and establishing playgrounds. His attractive personality and geniality made him extremely popular. In 1894 he entered politics as Democratic candidate for the State Senate; though then unsuccessful, in 1898 he was elected and served in three successive legislatures. He became known for his independence of party partisanship when he opposed Governor Lind (q.v.) on the question of withdrawing Minnesota troops from the Philippines. Johnson was a bold advocate of tariff reform and economy in the administration of the government. In 1904 he was nominated and elected Governor. The campaign was extremely bitter, and personalities entered largely into the speeches. The public issue concerned the merging of the Great Northern and the Northern Pacific railroads (see NORTHERN SECURITIES CASE), but Johnson was taunted with references to his family. His popularity with the Scandinavian element, his public record, and the assaults on his family turned public sentiment in his favor, and he was elected by a plurality of 6000 at a time when Roosevelt carried the State for the Republican national ticket by 146,000. As Governor, he achieved immense success, and through his influence legislation was enacted providing for employers' liability, the abolition of railroad passes, schools for delinquent girls, and a reformation of the civil service; he was also instrumental in effecting local and national reforms in insurance laws. He was reëlected Governor in 1906 by a plurality of 76,000, and again in 1908 by 20,000, although Taft carried the State by 85,000 votes. In the presidential campaign of 1908 Johnson was frequently mentioned for the Democratic nomination, and he received 46 votes in the Denver Convention. His prestige and success as Governor were not diminished by the quiet (though determined) method employed by him in dealing with the miners' strike of 1908. He had long suffered from appendicitis, and in 1909 an operation was performed, but failed to save his life.

JOHNSON, John Butler (1850–1902). An American civil engineer and educator. He was born at Marlboro, Ohio, and graduated at the University of Michigan in 1878. He was a member of the United States Lake and Mississippi River Surveys until 1883; professor of civil engineering at Washington University, St. Louis, Mo., from that date until 1898, and dean of the department of mechanics and engineering at the University of Wisconsin from 1898 until his death. The parabolic column formula, which he proposed, bears his name; his name is also connected with the roller extensometer, an instrument used in measuring the stretch in materials under test. In 1884 he assumed charge of the index department of the *Journal of the Association of Engineering Societies*, and in 1891 was put in charge of the timber-testing laboratory at St. Louis by the United States Forestry Bureau. His publications include *The Materials of Construction*, first published in 1897; *Theory and Practice of Surveying* (8th ed., 1904); *Engineering Contracts and Specifications* (3d ed., 1904); and he was joint author of *Modern Framed Structures* (1893).

JOHNSON, Joseph French (1853–). An American economist, born at Hardwick, Mass. He graduated from Harvard University in 1878; studied in Germany for one year; joined the staff of the Springfield *Republican;* was financial editor of the Chicago *Tribune;* and from 1890 to 1893 was proprietor of the Spokane (Wash.) *Spokesman*, which he had established. Thereafter until 1901 he was professor in the Wharton School of Commerce, University of Pennsylvania, and from 1899 to 1903 he lectured also on finance at Columbia University. In 1901 he became professor of political economy in, and in 1903 dean of, the School of Commerce, Finance, and Accounts at New York University. He reported on the national banking system of Canada for the National Monetary Commission and was a member of the commission on new sources of revenue for New York City in 1912 and of the commission to revise the banking laws of the State of New York in 1913. He edited the *Modern Business Series* and the *Journal of Accountancy*, contributed to the New International Encyclopædia, and published *Syllabus of Money and Banking* (1899), *Money and Currency* (1905; rev. ed., 1914), and *The Canadian Banking System* (1910).

JOHNSON, Lionel (1867–1902). A British poet and critic, of Irish descent, born at Broadstairs, Kent, and educated at Winchester and at Oxford. In his university days he was much under Walter Pater's influence. Though of a line of soldiers and Protestants, he chose literature for his profession and Catholicism for his creed, and much of his poetry took tone and color from his religion. He was active in the Irish Literary Society of London, founded in the 1890's, and, indeed, should be associated with the movement known as the Irish Literary Revival. (See Irish Literature, II.) Most of his life was passed in London, where he lived, a bachelor and a scholar, with his many books. For relaxation, he took long country rambles that tried his fragile health. He died on Oct. 4, 1902, in St. Bartholomew's Hospital, of a fractured skull caused by a fall while he was walking in Fleet Street on the night of September 29. "In the bitter pathos of his end he was not with Keats, but with Poe." He produced little, but what he wrote was of fine quality. The range of his scholarship, his taste, and his insight combined to make him an excellent critic, in which capacity he is represented by *The Art of Thomas Hardy* (London, 1894) and *Post Liminium: Essays and Critical Papers* (New York, 1911), edited by Thomas Whittemore. His poetry is marked by depth and restrained intensity of feeling, by refined beauty of form, and by a certain lucidity, wholesome soundness, and ordered firmness of structure that indicate his kinship with the classic spirit. His poems are collected in *Poems* (London, 1895) and in *Ireland, with Other Poems* (ib., 1897). Consult: W. B. Yeats's introduction to selections from Johnson in *A Treasury of Irish Poetry* (ib., 1900); L. I. Gurney, "Of Lionel Johnson, 1867–1902," in *Atlantic Monthly*, vol. xc (Boston, 1902).

JOHNSON, Manuel John (1805–59). An English astronomer, born in Macao, China, and educated at Addiscombe Military College. He took service in the St. Helena artillery; and, in an observatory built by the East India Company, he made a *Catalogue of 606 Principal Fixed Stars in the Southern Hemisphere* (1835), which won for him the gold medal of the Royal Astronomical Society. He entered Magdalen College, Oxford, in 1835, and on graduation, in 1839, succeeded Rigaud as director of the Radcliffe Observatory, which under his care became not merely a scientific centre, but a gathering place for the leaders of the Oxford High Church party. He published 18 volumes of *Radcliffe Observations* and wrote a catalogue of circumpolar stars, edited by Main in 1860. Johnson was president of the Royal Astronomical Society in 1857.

JOHNSON, Oliver (1809–89). An American Abolitionist and editor, born at Peacham, Vt. He entered the office of the *Vermont Watchman* at Montpelier as an apprentice, and as early as July 4, 1828, showed his sympathy with the Abolition movement by delivering a speech against slavery. In January, 1831, he began to publish the *Christian Soldier*, and soon afterward became intimate with William Lloyd Garrison. He was one of the founders of the New England Antislavery Society and edited the *Liberator* during Garrison's absence in Europe in 1833. Among the other papers of which he was an editor were the *National Antislavery Standard*, the *Antislavery Bugle*, and the *Pennsylvania Freedman*. He was an associate editor of the *Independent* when Garrison became a contributor in 1868. Later he occupied editorial positions on the *Weekly Tribune* and the *Christian Union*, and after 1881 was connected with the New York *Evening Post*. He published *William Lloyd Garrison and his Times, or Sketches of the Antislavery Movement in America* (1880).

JOHNSON, Owen (1878–). An American novelist, son of Robert Underwood Johnson, born in New York City and educated at the Lawrenceville (N. J.) School and at Yale University. His story of school life, *The Varmint* (1910), with its boyish high spirits, cleverness, and wholesomeness, is perhaps his best book. His *Stover at Yale* (1911), a college story, frank in its criticisms of certain phases of life in the author's alma mater, aroused a little storm of controversy. Other books of his are: *Arrows of the Almighty* (1901); *In the Name of Liberty* (1905); *Max Fargus* (1906); *The Eternal Boy* (1909); *The Humming Bird*

(1910); *Tennessee Shad* (1911); *The Sixty-first Second* (1912); *The Salamander* (1914; and dramatized). He also wrote the plays *The Comet* (1908), *Comedy for Wives* (1912), and an adaptation from the French, *The Return from Jerusalem* (1912).

JOHNSON, PERCIVAL NORTON (c.1793–1866). An English metallurgist. He was much employed in consultation at important English mines, was the first to establish rules for accurately determining the composition of bullion, and introduced into England the alloy known as German silver (q.v.). He improved the mechanical plant in some of the Cornish mines and made several important inventions in mining and metallurgy.

JOHNSON, REVERDY (1796–1876). An American jurist, born at Annapolis, Md., May 21, 1796. He was a son of John Johnson, himself an eminent lawyer, who became Chancellor of Maryland. Reverdy was educated at St. John's College at Annapolis, studied law in his father's office, and in 1815 was admitted to the Maryland bar. In 1817 he removed to Baltimore and was successively Deputy Attorney-General of Maryland and for four years a State Senator (1821–25). With Mr. Thomas Harris, he edited the reports of the Maryland Court of Appeals from 1820 to 1826. He gained a high reputation as a profound lawyer and was frequently employed in arguing important cases before the Supreme Court of the United States. He represented his native State in the United States Senate from 1845 to 1849, when he resigned his seat to enter President Taylor's cabinet as Attorney-General. After the death of General Taylor in 1850 Mr. Johnson continued to practice law in Baltimore. In 1863 he was again elected to the United States Senate, but before the expiration of his term was appointed Minister to England in 1868. His negotiations for a settlement of the disputed *Alabama* claims having proved unsatisfactory to the American government, and his convention with Great Britain being rejected by the Senate of the United States, Mr. Johnson was recalled in 1869. During the trial of the assassins and conspirators concerned in the murder of Abraham Lincoln, Mr. Johnson prepared an argument in behalf of Mrs. Surratt (afterward executed for complicity in the assassination) which the military court that tried the case refused to hear. Though not a master of statecraft nor a great politician, Reverdy Johnson was a man of great courage and independence of judgment as well as a consummate lawyer and earned a place of great distinction in the roll of the American bar. He died at Annapolis, Feb. 10, 1876.

JOHNSON, RICHARD MENTOR (1780–1850). An American legislator and politician, Vice President of the United States in 1837–41. He was born at Bryant's Station, Ky., was educated at Transylvania University, studied law and began practice at Grand Crossings in that State. His political career began in 1805 with his election to the Lower House of the Kentucky Legislature. In 1806 he was elected to the Tenth Congress and was reëlected to the Eleventh and Twelfth, serving from 1807 until 1813. At the outbreak of the War of 1812 he returned to Kentucky, where he recruited a regiment of mounted riflemen, serving during the recesses of Congress and occupying his seat during the sessions. In 1813 he raised a second regiment, of which he became colonel and which he commanded in Gen. William Henry Harrison's Canadian campaign. At the battle of the Thames, Oct. 5, 1813, according to tradition, he shot and killed Tecumseh (q.v.). He was not a member of the Thirteenth Congress, but was returned to the House by his constituents in 1814 and served until 1818. In 1819 he was elected to the United States Senate to fill the vacancy caused by the resignation of John J. Crittenden and was later reëlected, remaining in that body until 1829. In the Senate and in the House, of which he was again a member from 1829 to 1837, he was a strong supporter of Jackson, who in 1835 designated him as his personal choice for Vice President. In the Baltimore Convention in May of that year he was placed in nomination, his principal opponent being William C. Rives (q.v.) of Virginia. Opposition to his candidacy continued throughout the campaign, and when the electoral votes were counted it was found that, although Van Buren was elected, Virginia by casting her votes for William Smith of Alabama had prevented the choice of a Vice President. The election was therefore thrown into the Senate, where Johnson was promptly elected, receiving 33 votes to 16 for Francis Granger (q.v.) of New York. Opposition to Johnson having increased, at the Baltimore Convention in May, 1840, after the President had been indorsed and renominated, a resolution was passed declaring "that the Convention deem it expedient at the present time not to choose between the individuals in nomination" for the vice presidency, all of whom, it declared, were worthy of the office. In the electoral college, however, the Democratic electors voted generally for Johnson, giving him 48 votes, L. W. Tazewell of Virginia 11, and James K. Polk 1. In 1844 Johnson entered into the Democratic canvass for the presidential nomination, but was defeated.

JOHNSON, RICHARD W. (1827–97). An American soldier, born in Kentucky. He graduated at West Point in 1849 and up to the time of the Civil War was employed chiefly on frontier service. In 1861 he was commissioned colonel of the Third Kentucky Cavalry and soon afterward was made a brigadier general of volunteers. He took part as a cavalry commander in the western campaigns of 1861 and 1862 and on August 21 of the latter year was defeated and captured by Col. John H. Morgan, whom he had been sent to drive out of Tennessee. In the battle of Murfreesboro he commanded a division. At Chickamauga his division formed part of the command of General Thomas, and it was one of those which during the battle of Chattanooga charged up the heights of Missionary Ridge. The next year he commanded a division in the Army of the Cumberland during the invasion of Georgia and was severely wounded at the battle of New Hope Church (May 28, 1864). On August 22 of that year he was made chief of cavalry of the Military Division of the Mississippi. He commanded a cavalry division at the battle of Nashville, and on the second day was given the brevet rank of major general of volunteers, supplemented on March 13, 1865, by the brevet rank of brigadier general in the regular army, and on the same day he was brevetted major general in the regular army for "gallant and meritorious services during the war." He was mustered out of the volunteer service on Jan. 15, 1866, and became provost marshal general of the Military Division of the Tennessee, and later acting judge advocate in various military departments. He resigned in 1867 with the rank of major, which grade by an Act of Congress (March 3, 1875) was changed to that of brigadier general. He published *A Soldier's Reminiscences in Peace and War* (1866) and a *Memoir of Major General George H. Thomas* (1881).

JOHNSON, Robert Underwood (1853–). An American poet and editor, born at Washington, D. C., Jan. 12, 1853. He joined the staff of the *Century Magazine* in 1873, became associate editor in 1881, and in 1909, on the death of Richard Watson Gilder, succeeded to the editorial chair, which he occupied until May, 1913. He early became noted for his services in behalf of international copyright, as secretary of the American Copyright League doing much to secure the passage of the Law of 1891, for which he was decorated by the French and Italian governments. He had a hand in many important publishing undertakings, and it was on his persuasion that Gen. U. S. Grant wrote his *Memoirs*. He became permanent secretary of the American Academy of Arts and Letters. His writings include *The Winter Hare and Other Poems* (1891) and *Songs of Liberty and Other Poems* (1897). His *Saint Gaudens: An Ode* (third edition of poems) appeared in 1910, and the fourth edition was published under the same title in 1914. With C. C. Buel he edited the well-known *Century* articles relating to the Civil War, afterward published as *Battles and Leaders of the Civil War* (1887–88)—one of the most valuable compilations dealing with the subject.

JOHNSON, Rossiter (1840–). An American editor and author, born at Rochester, N. Y. In 1863 he graduated from the University of Rochester, which gave him the degree of LL.D. 30 years later. He married a daughter of Asahel C. Kendrick, and his sister was the wife of Joseph O'Connor (qq.v.). From 1864 to 1869 he was assistant editor of the Rochester *Democrat* (later *Democrat and Chronicle*), and in 1869–72 he edited the Concord (N. H.) *Statesman*. In 1873–77 he was an associate editor in the revision of the *American Cyclopædia*. He became editor of the *Annual Cyclopædia* in 1883, from 1886 to 1888 was managing editor of the *Cyclopædia of American Biography*, and in 1900–04 was editor in chief of the *Universal Cyclopedia*. Among other compilations edited by him are: *The British Poets* (3 vols., 1876); *Famous Single and Fugitive Poems* (1877); *Play-Day Poems* (1878), an anthology of humorous verse in English; *Fifty Perfect Poems* (1882), with C. A. Dana; the *Little Classics Series* of prose selections (16 vols., 1874–75; two additional vols., 1880; new ed., 1900); *The World's Great Books* (1898–1901); *Twentieth Century Biographical Dictionary of Notable Americans* (1904); the sumptuous and unique *Liber Scriptorum* (1893), in collaboration with J. D. Champlin and G. C. Eggleston; *Anthology of Italian Authors* (1907); *The War in Europe: Its Causes and Consequences* (1914). His original publications include: *Phaeton Rogers* (1881), a boy's story; *Idler and Poet* (1883), poems; *A History of the French War* (1882); *A History of the War between the United States and Great Britain* (1882); *A History of the War of Secession* (1888); *A Short History of the War between the United States and Spain* (1899); *The Story of the Constitution of the United States* (1906); *The Hero of Manila* (1912), a story for boys.

JOHNSON, Samuel (1696–1772). An American educator, born at Guilford, Conn. He graduated at Yale in 1714, became a tutor there in 1716, and in 1720 was ordained pastor at West Haven. Two years afterward he was converted to Episcopacy. From 1754 to 1763 he was president of King's College (later Columbia University), the first to hold that office. Johnson was an ardent polemic and carried on long controversies in behalf of apostolic succession and divine sovereignty. He wrote: *A System of Morality* (1746; reprinted by Franklin as *Elementa Philosophica* in 1752); *Three Letters from a Minister of the Church of England to his Dissenting Parishioners* (1733–37); and an *English and Hebrew Grammar* (1767; 2d ed., 1771). Consult Chandler, *Life* (London, 1824), and Beardsley, *Life and Correspondence of Samuel Johnson* (New York, 1874).

JOHNSON, Samuel (1709–84). An English lexicographer, essayist, and critic. He was born at Lichfield, Sept. 18, 1709, the son of Michael Johnson, a bookseller. He was sent to a dame school, from which he passed to the Lichfield grammar school, where he learned Latin, and then attended for a few months a school at Stourbridge. The years 1727–29 he spent at home in "lounging." Though indolent and desultory, he read widely and wrote some verse. In 1728 he entered Pembroke College, Oxford, where he became known for his various knowledge and a Latin translation of Pope's *Messiah*. At Oxford he learned Greek and read metaphysics. Melancholy by nature, he became a hypochondriac under the pressure of poverty. In October, 1731, he left Oxford without a degree, and two months later his father died, leaving him only £20. In 1732 he was usher in a school at Market Bosworth—a position for which he was particularly unsuited, owing to his extreme nervousness, which manifested itself in facial contortions. Aware of his failure and detesting the employment, he gave up school-teaching and went to live with a school friend in Birmingham. He probably contributed to the *Birmingham Journal*, for the publisher of which he made an abridged translation (1735) of Lobo's *Voyage to Abyssinia*. On July 9, 1735, he married the widow of a Birmingham mercer, his senior by 20 years. His wife's small fortune, about £800, enabled him to open a boarding school for young gentlemen at Edial Hall, near Lichfield. Few pupils attended, but among them was David Garrick. Johnson had for some time been thinking of London, as may be inferred from a letter he sent in 1734 to Edward Cave, proprietor of the *Gentleman's Magazine*, proposing to become a contributor. On March 3, 1737, he and Garrick, each having a few pence in his pocket, went to London. Later in the same year Johnson returned to Birmingham and brought his wife to London. Poor as Johnson had been hitherto, he had now to pass through a severe ordeal. For a period he went about ill clothed and ill fed, and, it is said, sometimes walked the streets with his friend Savage "for want of a lodging." In 1738 he became a regular contributor to the *Gentleman's Magazine*. At first he was employed to edit for Cave the parliamentary debates reported by William Guthrie, and then from July, 1741, to March, 1744, he wrote them himself, sometimes from notes furnished him and at other times from only the names of the speakers, always taking care that the "Whig dogs should not have the best of it." In the meantime he had published *London* (1738), an adaptation to London life of Juvenal's third satire. It was immediately successful and placed Johnson among the best followers of Pope. In 1744 appeared his *Life of Richard Savage*, which, in depicting the terrible career of this unfortunate poet, throws indirectly much light on Johnson's own hardships. In 1749 he published another adaptation of Juvenal, *The Vanity of Human Wishes*, the finest of his poems. Johnson had long before written a tragedy called *Irene*. In February, 1749, Garrick brought it out at Drury Lane. Though Johnson received from the author's three nights and the copyright nearly £300, it was only a moderate success. The next year he began—writing most of the essays himself—the *Rambler*, a semiweekly in imitation of the *Spectator*, which ran for two years (March 20, 1750, to March 14, 1752). To Johnson, already known as a poet, this periodical gave rank as an impressive moralist. Three days after the last issue of the *Rambler* Johnson's wife died. At this time Johnson was in the midst of his labors on a new *Dictionary of the English Language*. The *Plan* for it, published in 1747, was inscribed to Lord Chesterfield, evidently with a view to that nobleman's patronage. Chesterfield, however, approved of the work in no public manner until December, 1754, when it was near completion. In a memorable letter Johnson then spurned the overtures of the noble lord (Feb. 7, 1755). In the following April the *Dictionary* appeared. For this undertaking Johnson was not fully equipped. He had no knowledge of the English language and literature in its earlier periods; consequently the dictionary was untrustworthy in its etymologies. On the other hand, he had read widely in the seventeenth century and was thus able to illustrate the use of words by admirable quotations. He at once became known as the great lexicographer. His splendid struggle with adversity, however, was not quite over. The next year he was arrested for debt. In 1758 he began a series of essays called the *Idler*, not so good as the *Rambler*, which he carried on for two years. Now occurred one of the most touching episodes in his heroic life, the writing of *Rasselas* (1759), "in the evenings of a week," to pay the expenses of his mother's funeral. It is hardly a novel, but rather a magnificent moral tract, into which are compressed *The Vanity of Human Wishes* and the best of the *Rambler*. In 1762 he accepted, after some hesitancy, a government pension of £300. It was probably in 1763 that Johnson founded his famous Literary Club, which held its meetings at the Turk's Head tavern, and which included the best talkers of the day and the men most distinguished in the arts, among them Goldsmith, Boswell, Burke, Sir Joshua Reynolds, and Garrick. Thereafter his life was passed in comparative ease. In 1763 he had made the acquaintance of James Boswell, his future biographer; and in 1765 he began his intimacy with the Thrales, who received him into their home at Southwark and took him with them to Streatham for the summer months. For 16 years they ministered to his comfort. Composition now becoming very onerous for him, he found an outlet for his thoughts in brilliant conversation. To this period, however, belongs some notable work. In 1765 he brought out an edition of Shakespeare, proposals for which had been issued eight years before. The record of a visit to Scotland and the Hebrides with Boswell in 1773 he published under the title *A Journey to the Western Isles of Scotland* (1775). His literary career closed with the *Lives of the Poets* (1779–81), the most admirable of his essays both in thought and in style. He died in London Dec. 13, 1784, and was buried in Westminster Abbey. The degree of LL.D. he had received both from Dublin (1765) and from Oxford (1775), but he himself rarely used the title. Johnson was the central figure in English literature for a quarter of a century. Time, however, has taken away much of his prestige. As a critic, he is narrow; and his style is ponderous. On the other hand, his opinions show independent and robust thinking; and his style, even in the *Rambler*, has at times a delightful rhythm. Of the charm of his conversations there can never be any question, and, among English conversationalists, the palm by general consent must go to him. Of Johnson as a man the record is complete. Though Boswell noted his sayings and doings in a great variety of situations, nothing was ever said or done to lessen one's respect for his noble qualities of mind and heart.

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JOHNSON, SAMUEL (1822–82). An American clergyman and reformer. He was born at North Andover, Mass., and graduated at Harvard in 1842 and at the Harvard Divinity School in 1846. He preached for some time at Dorchester, but displeased his congregation there by his opposition to slavery. In 1851 he became pastor of a "free church" in Lynn, Mass., being independent in his religious opinions. He edited, jointly with Samuel Longfellow, a collection of sacred poetry entitled *Hymns for Public and Private Devotion* (1846), and was author of *The Worship of Jesus* (1868) and of *Oriental Religions—India* (1872), *China* (1877), *Persia* (1885). Consult Longfellow, *Memoir of Samuel Johnson* (Boston, 1883).

JOHNSON, SAMUEL WILLIAM (1830–1909). An American agricultural chemist, born at Kingsboro, N. Y. He was educated at the Scientific School of Yale College and studied at the universities of Leipzig and Munich. He was made professor of analytical chemistry at the Yale Scientific School in 1856, taught agricultural chemistry there from 1857 to 1875, and from 1875 to 1896 served as professor of theoretical and agricultural chemistry. From 1877 to 1899 he was also director of the Connecticut Agricultural Experiment Station. In 1858 he was appointed chemist to the State Agricultural Society and began the publication of a series of notable reports upon commercial fertilizers and on other agricultural subjects. These continued after the society was replaced by the Connecticut State Board of Agriculture. He was a member of the National Academy of Sciences and in 1878 was president of the American Chemical Society. His publications include: *Essays on Peat, Muck, and Commercial Manures* (1859); *Peat and its Uses* (1866); *How Crops Grow* (1868); *How Crops Feed* (1870). He edited Fresenius' *Manual of Quantitative Chemical Analysis* (1st, 2d, and 3d eds., 1864, 1875, 1883).

JOHNSON, Thomas (1732–1819). An American statesman, born at St. Leonard, Md. He studied law in Annapolis; was a leader of the pre-Revolutionary agitation in Maryland; became a prominent member of the First Continental Congress, to which he was reëlected in 1776; moved the appointment of Washington as commander in chief (June, 1775); and in 1776 was made brigadier general of the militia of the province, going to Washington's relief in the winter of that year. Early in 1777 he was elected Governor of Maryland and held that office through 1779, acting with much energy and vigor in behalf of the Continental Congress and its forces. He was returned to the Provincial Congress in 1780 and became a member of the House of Delegates in the same year. From 1781 to 1787 he sat in the Continental Congress; he became a supporter of the Constitution and was a member of the Maryland convention which ratified that instrument in 1789. He became associate in the United States Supreme Court (1791), refused to succeed John Rutledge as Chief Justice, and refused the portfolio of State (1795). He was a member of the commission which laid out the city of Washington.

JOHNSON, Thomas Cary (1859–). An American Presbyterian theologian. He was born in Monroe Co., Va. (afterward part of W. Va.), and studied at Hampden Sidney College (A.B., 1882), at the Union Theological Seminary in Virginia, and at Yale. He was professor of Old and New Testament exegesis in the Austin (Tex.) Theological Seminary from 1888 to 1890 and thereafter was a member of the faculty of the Virginia Union Seminary—professor of the English Bible and pastoral theology (1891–92), of ecclesiastical history and polity (1892–1913), and then of systematic theology. He wrote: *A History of the Southern Presbyterian Church* (1894); *John Calvin and the Genevan Reformation* (1900); *The Life and Letters of Robert Lewis Dabney* (1903); *The Life and Letters of Benjamin Morgan Palmer* (1906); *Virginia Presbyterianism and Religious Liberty* (1907); *Introduction to Christian Missions* (1909); *Baptism in the Apostolic Age* (1912).

JOHNSON, Thomas Loftin (usually known as Tom L. Johnson) (1854–1911). An American mayor and municipal reformer, born at Georgetown, Ky. His family having suffered heavy financial losses in the Civil War, in early youth he obtained employment in a street-railway office. He rose rapidly to positions of responsibility and became interested in city transportation problems, inventing several devices, among which were a fare box and the Johnson rail, which he sold for large sums. In 1876 he purchased part interest in a street railway of Indianapolis and later acquired large holdings in Cleveland (where he encountered the fierce opposition of Marcus A. Hanna), in Detroit, and in Brooklyn. All of his lines were made popular and profitable by the introduction of through fares and transfers. In Cleveland he became known also as an iron manufacturer. After disposing of his street-railway interests, Johnson, then a wealthy man, entered politics. In 1898 he was unsuccessful as Democratic candidate for Congress, being defeated by T. E. Burton (q.v.); in 1890 and 1892 he was successful. In his campaigns Johnson announced his adherence to and advocacy of the single-tax ideas of Henry George and of public ownership of utilities, and in Congress he urged especially the adoption of the single tax for the District of Columbia. He attracted national attention by his plans of municipal ownership. Elected mayor of Cleveland in 1901 and thrice reëlected, during this period of eight years Johnson transformed the city government. His persistence and success in introducing radical reforms, and especially his bitter fight to secure three-cent fares over all street-car lines in the city, were matters of country-wide interest. In 1903 he was an unsuccessful candidate for the governorship. His public service ended in 1910. Consult his autobiography, *My Story,* edited by E. J. Hauser (New York, 1911).

JOHNSON, Virginia Wales (1849–). An American author, born in Brooklyn, N. Y. After 1875 she resided in Europe. Her publications, mainly for young people, include: *The Kettle Club Series* (1870); *Joseph the Jew* (1873); *A Sack of Gold* (1874); *The Catskill Fairies* (1875); *The Calderwood Secret* (1875); *The Neptune Vase* (1881); *Tulip Place* (1886); *The House of the Musician* (1887); *The World's Shrine* (1902); *Many Years of a Florence Balcony* (1911); *A Lift on the Road* (1913), short stories.

JOHNSON, Walter Rogers (1794–1852). An American chemist, born at Leominster, Mass. He graduated from Harvard in 1819. From 1839 to 1843 he was professor of physics and chemistry in the University of Pennsylvania. He devoted himself to studying the strength of materials and mechanical construction and wrote: *Use of Anthracite in the Manufacture of Coal* (1841); *Report on Coals* (1844); *Coal Trade of British America* (1850); and several scientific textbooks.

JOHNSON, Sir William (1715–74). A British soldier and superintendent of Indian affairs in America, born in Smithtown, County Meath, Ireland. He was educated for mercantile pursuits, but in 1738 assumed the management of the landed estates of his uncle, Sir Peter Warren, in the Colony of New York. In that year he settled on a tract of land in the Mohawk valley, about 25 miles west of the present town of Schenectady, and at once undertook the improvement and colonization of his uncle's lands. His relations with the Indians, with whom he was soon engaged in trade, were characterized by honesty and fair dealing. He soon acquired a knowledge of their language, familiarized himself with their customs, and cultivated their friendship. In 1744 Governor Clinton appointed him superintendent of the affairs of the Six Nations, and two years later he was made Indian commissioner of New York. In 1748 he was charged by the government with the defense of the New York frontier, and on one occasion by his tact and personal influence was able to effect the settlement of a difficulty between the Indians and the colonists. In the meantime he had received a royal commission as a member of the Governor's Council, and in 1754 was one of the commissioners to the Albany Convention (q.v.) called to treat with the Indians and at the same time to prepare a plan of union for the Colonies. Upon the outbreak of the French and Indian War (q.v.) he was given sole charge of Indian affairs in New York, was commissioned a major general of Colonial forces, and was charged with the conduct of the expedition against Crown Point. In this capacity he performed valuable service to the Colonial cause by defeating and capturing Baron Dieskau at Lake George. It was largely through his influence that the Six Nations were kept from joining the French in this struggle. For this service he received the thanks of Parliament, accompanied by a grant of £5000, and at the same time was created a baronet, and in the following year was made superintendent of all affairs of the Six Nations and other Northern Indians. He subsequently took part in the futile attempts to relieve Oswego and Fort William Henry and was present at the battles of Ticonderoga and Fort Niagara. In the latter engagement, after the death of General Prideaux, he assumed the chief command, cut to pieces the French army, and compelled the surrender of the fort. Later he led the Indians in an expedition to Canada and was present at the surrender of Montreal. Through his influence the Six Nations, as a whole, were prevented from joining the Pontiac conspiracy, although he was unable to secure the absolute neutrality of the Senecas. In addition to the reward which he had already received, the King granted him a tract of nearly 100,000 acres of land in the Mohawk valley, where he built Johnson Hall, which is still standing and which became the nucleus of Johnstown, N. Y. Here Sir William lived for the remainder of his life in baronial fashion. His last public service was the conclusion of the Treaty of Fort Stanwix in 1768. (See FORT STANWIX.) He died July 11, 1774, in his fifty-ninth year. In 1739 Johnson married the daughter of a neighboring German settler, and by her had three children. After her death he had several mistresses, both Indian and white, one of whom was "Molly" Brant, a sister of the Mohawk chief, Joseph Brant or Thayendanegea. By her he had eight children. Sir William prepared a paper of some value on "The Language, Customs, and Manners of the Six Nations," published in the *Transactions of the Philosophical Society* of Philadelphia for November, 1772, and he wrote a great number of letters of historical value. Consult: *Calendar of the Sir William Johnson Manuscripts*, compiled by Day (Albany, 1909); Stone, *Life of Sir William Johnson* (2 vols., ib., 1865); Griffis, *Sir William Johnson and the Six Nations* (New York, 1891); Buell, *Sir William Johnson* (ib., 1903).

JOHNSON, WILLIAM (1771-1834). An American jurist, born at Charleston, S. C. He graduated at Princeton in 1790; studied law under C. C. Pinckney; was admitted to the bar in 1793; and represented Charleston in the State Legislature from 1794 to 1798, when he received the appointment to the Court of Common Pleas. In 1804 he was appointed to the United States Supreme Court, where his course was marked by great independence, especially in a case based on the Embargo Act, the legality of which he denied. His opposition to nullification was so strong that in 1833 he had to leave his own State. He spent a few months in western Pennsylvania and in 1834 removed to Brooklyn, N. Y. He wrote *Life and Correspondence of Major-General Nathanael Greene* (1822).

JOHNSON, WILLIAM. See COBY, WILLIAM JOHNSON.

JOHNSON, WILLIAM SAMUEL (1727-1819). An American jurist and educator, born at Stratford, Conn. He was the son of the Rev. Samuel Johnson (q.v.), who became the first president of King's College (now Columbia University). He graduated at Yale in 1744 and in 1747 received the degree of A.M. from Harvard. After graduation he planned to enter the Church and worked for a time for the Society for the Propagation of the Gospel, but changed his plans, studied law, and practiced in the courts of Connecticut and New York. In 1761 and 1765 he was a member of the Lower House of the Connecticut Legislature and then was made a member of the Upper House or Governor's Council. In 1765 he was a delegate from Connecticut to the meeting at New York known as the Stamp Act Congress. From 1766 to 1771 he was in London as counsel for the Colony in litigation concerning the title to land secured from the Mohegan Indians. On his return he was again a member of the Governor's Council and in 1772 was made judge of the Superior Court. After the battle of Lexington he was one of a committee sent to General Gage to consider the possibility of peace. He was opposed to the war and during its progress remained quietly at home practicing his profession, though he contributed money to the American cause. From 1784 to 1787 he was a member of the Continental Congress and in 1787 was at the head of the Connecticut delegation to the convention to form the Federal Constitution. He was again made a member of the Governor's Council and also in this year (1787) the first president of Columbia College after its reorganization. In 1789 he was elected the first Senator of the United States from Connecticut. When the seat of government was removed to Philadelphia, he attended one session of Congress, but in 1793 resigned in order to devote his whole time to the college. In 1800, on account of failing health, he resigned the presidency and retired to Stratford, where he lived quietly until his death. He received the degree of D.C.L. from Oxford in 1766 and later LL.D. from Yale. While in London he made many friends, among them being Dr. Samuel Johnson, with whom he corresponded. His letters to the governors of Connecticut during this period, giving his view upon the Colonial situation, are printed in the *Massachusetts Historical Collection*, 5th series, vol. ix. Consult Beardsley, *Life of William Samuel Johnson* (Boston, 1876).

JOHNSON, WILLIAM WOOLSEY (1841-). An American mathematician, born at Owego,

N. Y. In 1862 he graduated from Yale University (A.M., 1868). He served in the United States Nautical Almanac Office in 1862–64; taught mathematics in the United States Naval Academy (1864–70), at Kenyon College, Ohio (1870–72), and at St. John's College, Mo. (1872–81); and in 1881 returned to Annapolis as professor of mathematics. In 1913 he accepted in addition a professorship in the navy. He is author of: *An Elementary Treatise on the Integral Calculus* (1881); *Curve Tracing in Cartesian Co-ordinates* (1884); *The Theory of Errors and Methods of Least Squares* (1890); *A Treatise on Ordinary and Partial Differential Equations* (1889); *An Elementary Treatise on Theoretical Mechanics* (1901); *Treatise on Differential Calculus* (1904); *Differential Equations* (1906); *Treatise on Integral Calculus* (1907); *An Elementary Treatise on the Differential Calculus* (1908).

JOHN'SONBURG. A borough in Elk Co., Pa., 164 miles northeast of Pittsburgh, on the Buffalo, Rochester, and Pittsburgh, the Erie, and the Pennsylvania railroads (Map: Pennsylvania, D 3). It is in a productive farming and lumbering region and has extensive paper mills. There are some deposits of coal, clay, oil, and natural gas. Pop., 1910, 4334.

JOHNSON CITY. A city in Washington Co., Tenn., 106 miles east by north of Knoxville, on the Southern, the Carolina, Clinchfield, and Ohio, and the East Tennessee and Western North Carolina railroads (Map: Tennessee, H 2). It is known as a summer resort, having an elevated site and picturesque mountain scenery. The mountain branch of the United States Soldiers Home and the East Tennessee State Normal School are situated here. There is also a public library. The city is also a manufacturing centre, with woodworking establishments, an iron furnace, rolling mills, cigar, box, table, and furniture factories, a foundry and machine shops, a tannery, and several brick plants. Johnson City is governed under a charter of 1897, which provides for a mayor, elected biennially, and a unicameral council. The water works are owned by the municipality. Pop., 1900, 4645; 1910, 8502; 1914 (U. S. est.), 10,143.

JOHNSON GRASS. A fodder grass of the southern United States. See ANDROPOGON.

JOHN'STON. A town in Providence Co., R. I., adjoining Providence, on the New York, New Haven, and Hartford Railroad. It has worsted mills, wool sorting and scouring works, and a soap factory. Pop., 1900, 4305; 1910, 5935.

JOHNSTON, ALBERT SIDNEY (1803–62). An American soldier, prominent on the Confederate side in the Civil War. He was born at Washington, Ky., Feb. 3, 1803, graduated at West Point in 1826, and was assigned to the Second United States Infantry. He fought in the Black Hawk War, but resigned from the army, April 24, 1834, and emigrated to Texas. In 1836 he joined in the struggle for Texan independence, enlisting as a trooper, but was soon made adjutant general and then commander of the Texan army. In 1838 he was appointed Secretary of War of the young Republic and displayed political wisdom and military ability in dealing with Mexican and Indian encroachments. He resigned his office early in 1840 and became a planter.

When the Mexican War broke out, he became colonel of the First Regiment of Foot Riflemen of Texas, six months' volunteers, and was present at the siege of Monterey as inspector general on the staff of Gen. W. O. Butler. After some years of retirement he was appointed paymaster, in 1849, and colonel of the Second (since Fifth) United States Cavalry, in which his lieutenant colonel was Robert E. Lee, in 1855. In 1857, the Mormons having defied the United States authority, a military expedition was sent against them. At a late period in the summer the Mormons began actual hostilities against the government, destroying its supply train and threatening its troops. In an emergency the command was transferred to Colonel Johnston, whose march to Utah was conducted with rare judgment and courage. He converted an impending calamity into a solution without bloodshed of a serious military and political problem. For these services he was brevetted brigadier general, remaining in command in Utah until Feb. 29, 1860. At the outbreak of the Civil War General Johnston was in command of the Department of the Pacific, with headquarters at San Francisco, but April 10, 1861, he resigned his commission and, proceeding to Richmond, entered the service of the Confederacy, being appointed general and placed in command of the Confederate forces in the West. He held the line of Bowling Green, Ky., from September, 1861, to February, 1862, against greatly superior forces. On the fall of Fort Henry and Fort Donelson (q.v.) in February he effected his retreat through middle Tennessee to Corinth, Miss., where he assembled the entire force under his command east of the Mississippi. Advancing with his army, 40,000 strong, he attacked Grant's army at Shiloh Church unexpectedly on April 6, 1862, and drove him to the cover of his gunboats at Pittsburg Landing, capturing more than 3000 prisoners. At this critical point General Johnston was killed while leading a charge, and a lull ensued in the battle. A few hours later General Beauregard, who succeeded to the command, withdrew the Confederate troops from their advanced position, and Generals Buell and Lew Wallace coming up with reënforcements for Grant during the night, the battle was renewed the next day, and Beauregard was forced to fall back to Corinth. General Johnston was regarded by prominent officers of both armies as one of the most aggressive and brilliant of the Confederate leaders and at the time of his death as unsurpassed in handling large bodies of men in action. In his message to the Confederate Congress President Davis said: "Without doing injustice to the living, it may safely be said that our loss is irreparable." The subsequent history of the war in the West abundantly confirmed this tribute. Consult the exhaustive and valuable biography, *Life of Albert Sidney Johnston* (New York, 1878), by his son, W. P. Johnston.

JOHNSTON, ALEXANDER (1849–89). A political and constitutional historian, born in Brooklyn, N. Y. From 1883 to 1889 he was professor of political economy at Princeton. He wrote a useful and popular *History of American Politics* (1879); *Genesis of a New England State: Connecticut* (1884); *History of the United States for Schools* (1886); *History of Connecticut* (1887); *American Political History, 1763–1876. Part I: The Revolution, and the Growth of Nationality* (1905); *Part II:*

Slavery Controversy, Civil War, and Reconstruction (1906), posthumous. He edited *Representative American Orations* (1885). His article on the history of the United States in the *Encyclopædia Britannica* was later published as a volume. He also contributed to Lalor's *Cyclopædia of Political Science* (1881–84).

JOHNSTON, Alexander Keith (1804–71). A Scottish cartographer, born near Edinburgh and educated at Edinburgh University. His first important work, the *National Atlas*, was published in 1843. Its merits received immediate recognition, and Johnston was appointed Royal Geographer for Scotland. Five years later appeared his *Physical Atlas of Natural Phenomena*, the publication of which was the signal for a shower of honors from the geographical societies of Europe. A second edition, greatly improved, was issued in 1856. In 1850 appeared a very useful *Dictionary of Geography*, better known as *Johnston's Gazetteer* (5th ed., 1877). His *Royal Atlas of Geography* (1861) is probably the most beautiful and minutely accurate ever executed in the English language. He was the draftsman of a vast number of maps which were published separately and in series.

JOHNSTON, Christopher (1856–1914). An American Assyriologist. He was born at Baltimore, Md., graduated from the University of Virginia in 1876 and from the medical department of the University of Maryland in 1880, and practiced medicine until 1888. He then entered Johns Hopkins as a student of Semitics and taught at that university before and after taking the degree of Ph.D. in 1894—as instructor (1891–94), associate (1894–99), associate professor of Oriental history and archæology (1899–1908), and professor. He edited *Ancient Empires of the East* (1906), contributed to the New International Encyclopædia, and published *Epistolary Literature of the Assyrians and Babylonians* (1896).

JOHNSTON, Gabriel (1699–1752). A Colonial Governor of North Carolina. He was born in Scotland and was at one time professor of Oriental languages in the University of St. Andrews, where he had received his education. In 1734 he was appointed Governor of North Carolina, through the influence of the Earl of Wilmington, in whose honor he renamed the town of Newton, calling it Wilmington. Though he was often at odds with the people, he showed himself a man of liberal views, with an earnest desire to promote the welfare of the people. During his administration, which lasted until his death in 1752, the population of the Colony increased about threefold. For an account of his administration, consult Ashe, *History of North Carolina*, vol. i, chap. xix (Greensboro, N. C., 1908).

JOHNSTON, George (1797–1855). A British naturalist, born at Simprin, Scotland. He studied medicine with Dr. Abercrombie, graduated at the University of Edinburgh in 1819, and practiced his profession at Berwick-on-Tweed until 1853. He was thrice mayor of Berwick. Besides numerous contributions to the *Edinburgh Philosophical Journal* and other scientific periodicals, he published: *History of British Zoöphytes* (1838); *History of British Sponges and Lythophytes* (1842); *Introduction to Conchology* (1850); *Terra Lindisfarnensis: The Natural History of the Eastern Borders* (1854).

JOHNSTON, George Ben (1853–). An American surgeon. He was born at Tazewell, Va., studied in the university of that State in 1870–75, and graduated from University Medical College (New York University) in 1876. He became professor of surgery at the Medical College of Virginia and surgeon of the Memorial Hospital, Richmond, Va., of the Johnston-Willis Sanatorium, and of the Abingdon (Va.) Hospital. He served as president of the Southern Surgical and Gynæcological Association (1887), of the Medical Society of Virginia (1897), and of the American Surgical Association (1904–05). Many of his papers were published in the *Medical Register*.

JOHNSTON, Sir Harry Hamilton (1858–). An African explorer, born in London. He was educated at Stockwell Grammar School and at King's College, London, and also studied at the Royal Academy of Arts (1876–80). In 1879–80 he traveled in north Africa and in 1882–83, with the Earl of Mayo, explored Portuguese West Africa and the river Congo. In 1884 he was at the head of a scientific expedition to Mount Kilimanjaro. He explored Lakes Nyassa and Tanganyika in 1889, and in 1900 climbed Mount Ruwenzori. At various times he held consular positions in Africa, from 1899 to 1901 being special commissioner, commander in chief, and Consul General for Uganda Protectorate. He received gold medals from the Zoölogical, Royal Geographical, and Royal Scottish Geographical societies. His works, besides contributions on African ethnology, geography, and zoölogy to scientific and popular periodicals, especially the *Proceedings of the Royal Geographical Society* (1883–90), are: *Essays on the Tunisian Question* (1880–81); *The River Congo* (1884); *Kilimanjaro* (1885); *The History of a Slave* (1889); *Life of Livingstone* (1891); *British Central Africa* (1897); *A History of the Colonization of Africa by Alien Races* (1899); *The Uganda Protectorate* (1902); *British Mammals* (1903); *The Nile Quest* (1903); *Liberia* (1906); *George Grenfell and the Congo* (1908); *A History of the British Empire in Africa* (1910); *The Negro in the New World* (1910); *The Opening-up of Africa* (1911); *Views and Reviews* (1912); *Common Sense in Foreign Policy* (1913); *Phonetic Spelling* (1913).

JOHNSTON, James Finley Weir (1796–1855). An English chemist, born at Paisley. He was educated at the University of Glasgow and later studied chemistry under Berzelius. From 1833 until his death he was reader in chemistry and mineralogy at the University of Durham. In 1849–50 he spent several months in the United States, studying the agricultural conditions of the sections he visited. His writings on scientific agriculture, agricultural chemistry, and allied subjects comprise many volumes, and some of them have passed through a very large number of editions. We may mention here his *Catechism of Agricultural Chemistry and Geology* (1844, and more than 50 subsequent editions in English, as well as translations into several foreign languages); *Notes on North America, Agricultural, Economical, and Social* (1851); *The Chemistry of Common Life* (2 vols.), originally published in 1853–55.

JOHNSTON, John Humphreys (1857–). An American portrait and landscape painter. He was born in New York and studied there under La Farge and in Paris under Lefebvre and Doucet. Although La Farge's influence is visible in Johnston's methods, color scheme, and sympathetic conception of his subject, his work has a distinctly individual note. For his "Pink Domino" he received the Temple gold medal in Philadelphia in 1896; the "Portrait of the Artist's Mother" is in the Luxembourg Museum; "Moonlight, Finisterre," is in the Carnegie Institute, Pittsburgh. Among the best known of his other paintings are "Sarah Bernhardt as Lorenzaccio" and "Mystery of the Night." He made his home chiefly in Venice, was appointed Chevalier of the Legion of Honor in 1901, and received a gold medal at Munich in 1902.

JOHNSTON, Joseph Eggleston (1807-91). An eminent American soldier, prominent on the Confederate side during the Civil War. He was born near Farmville, Prince Edward Co., Va., Feb. 3, 1807; graduated at West Point in 1829, being a classmate of Robert E. Lee; was made brevet second lieutenant, Fourth Artillery; was engaged for a time in garrison duty; took part in the Black Hawk War; and served in the Seminole War, for part of the time as aid to General Scott, until 1837, when he resigned his commission and became a civil engineer. He reentered the army on July 7, 1838, as first lieutenant of topographical engineers and was brevetted captain on the same date for gallantry in the Seminole War. In September, 1846, he was promoted to be captain. In the Mexican War he served with distinction throughout the Southern campaign, was appointed lieutenant colonel of voltigeurs in April, 1847, and was brevetted major and colonel, United States Army, for his conduct at Cerro Gordo, where he was severely wounded. At the head of the voltigeurs Colonel Johnston took part in the storming of Chapultepec and for gallantry was brevetted lieutenant colonel. In 1853-55 he had charge of Western river improvements and in March, 1855, was appointed lieutenant colonel, First United States Cavalry, after which he was engaged in various duties in Utah, Kansas, and elsewhere. In June, 1860, he was appointed quartermaster general of the army, with the rank of brigadier general. On April 20, 1861, he resigned his commission and was appointed one of the first five brigadier generals in the Confederate service. These five were soon afterward made full generals. Johnston with about 9000 men joined Beauregard at Manassas, and they defeated the Federal army under General McDowell at the first battle of Bull Run, July 21, 1861. In the early part of the campaign of 1862 Johnston had command of all the Confederate forces in Virginia and as such was in charge of the early operations against McClellan in the Peninsular campaign. At the battle of Fair Oaks, May 31, 1862, he was severely wounded and for several months was disabled for service. On reporting for duty in November, he was assigned, notwithstanding the hostility of President Jefferson Davis, to the Military Department of Tennessee. In April, 1863, he reported himself still unfit for active service. Some weeks later, however, he made an attempt to relieve Vicksburg, then besieged by Grant, but was defeated at Jackson on May 14. After the defeat of Bragg by General Grant at Chattanooga, Nov. 24-25, 1863, Johnston was put in command of all the forces of the Southwest. With 55,000 men he first occupied the fortified position of Dalton, Ga. General Sherman attacked him (May, 1864) with a superior force and compelled him to fall back to Resaca; thence, after a severe battle, to Allatoona Pass, to Kenesaw Mountain, where Johnston beat back his assailants, and across the Chattahoochee. General Sherman then threatened his line of communication with Atlanta, his base of supplies and a place of great military importance. Johnston reached that city in July, 1864, and determined to hold it to the last; but the authorities at Richmond were dissatisfied with his Fabian policy and on July 17 ordered him to turn over his command to General Hood. Near the close of February, 1865, after Sherman had captured Atlanta and marched without opposition to Savannah and into South Carolina, Johnston, at the earnest request of General Lee, was assigned to the command of the remnant of the Army of the Tennessee and of all the troops in South Carolina, Georgia, and Florida and was ordered to "concentrate all available forces and drive back Sherman." But his force being inferior to that of Sherman, he was several times defeated, and on April 26, 1865, having learned of Lee's surrender of the Army of Northern Virginia, and after consultation with President Davis and members of the Confederate cabinet, he capitulated to Sherman at Durham's Station, N. C., upon terms similar to those agreed upon at Appomattox. The testimony of Johnston's principal opponents and of an able and impartial British military critic must be taken as a fair estimate as to his merits as a soldier. General Grant said: "I have had nearly all the Southern generals in high command in front of me, and Joe Johnston gave me more anxiety than any of the others." Sherman said he was "equal in all the elements of generalship to Lee." Colonel Chesney wrote: "If men were to be judged of solely by the difficulties they overcame, independently of the direct results achieved, then General Johnston might fitly head the list of great American commanders; for on his side was neither the supreme military power wielded by Grant, nor the prestige which made Lee almost independent of those who nominally controlled him; much less the harmony of thought and action with his superior which assisted Sherman from first to last. . . . In all these points, therefore, he was at a striking disadvantage as regarded his opponent; yet with these against him, and with but one-half the number of the Federals, he contrived to hold them back, led though they were with such versatile skill and unwearied energy as the records of modern war can hardly match, for nearly two months and a half, . . . a feat that should leave his name in the annals of defensive war at least as high as that of Fabius or Turenne or Moreau." After the war Johnston resided for several years in the South, holding offices in railroad, express, and insurance companies. He was elected to Congress from the Richmond district of Virginia in 1876 and was appointed United States Commissioner of Railroads in 1885 by President Cleveland. He was a pallbearer at the funerals of Grant and Sherman. He published a *Narrative of Military Operations during the Late War* (1874). Consult Hughes, *General Johnston* (New York, 1893), in the "Great Commanders Series."

JOHNSTON, Mary (1870-). An American novelist, born at Buchanan, Botetourt Co., Va. She was educated at home and began authorship with *Prisoners of Hope* (1898), which was followed by *To Have and to Hold* (1899) and *Audrey* (1902), all stories of Colonial Virginia, which had, each, a good reception. Her novels include also: *Sir Mortimer* (1904); *The Goddess of Reason* (1907); *Lewis Rand* (1908); *The Long Roll* (1911); *Cease Firing* (1912); *Hagar* (1913); *The Witch* (1914). *Audrey* and *Sir Mortimer* were dramatized.

JOHNSTON, Richard Malcolm (1822–98). An American author, born in Hancock Co., Ga., March 8, 1822. He graduated at Mercer University, Georgia (1841), taught for a year, was admitted to the bar, practiced successfully, became professor of literature in the University of Georgia (1857), left this post at the outbreak of the Civil War, opened a boarding school for boys at Sparta, Ga., removed this institution in 1867 to Baltimore Co., Md., and maintained it there many years. Towards the end of his life he resided in Baltimore. He gained literary mark by sketches of rural Georgia, *Dukesborough Tales*, first printed in the *Southern Magazine* and collected in 1883. He contributed frequently to magazines and published: *A History of English Literature* (1879), with W. H. Browne; *Old Mark Langston* (1884); *Two Grey Tourists* (1885); *Mr. Absalom Bilingslea and Other Georgia Folk* (1887); *The Primes and their Neighbors* (1891). *Dukesborough Tales* contains his best work. He wrote a *Biography of Alexander H. Stephens* (1883), with W. H. Browne.

JOHNSTON, Robert Matteson (1867–). An American historian. Born in Paris, he was educated in France, England, and Germany, graduated from Cambridge University (M.A.) in 1889, and became a barrister at law of the Inner Temple. In 1904 he lectured at Harvard University and Mt. Holyoke College, in 1907–08 was professor of history at Bryn Mawr College, and after 1908 was assistant professor of history at Harvard. He is author of *The Roman Theocracy and the Republic, 1846–49* (1901); *Napoleon: A Short Biography* (1904); *The Napoleonic Empire in Southern Italy and the Rise of the Secret Societies* (1904); *The Memoirs of Malakoff* (1907); *American Soldiers* (1907); *The French Revolution* (1909); *The Corsican* (1910); *The Holy Christian Church* (1912); *Mémoire de Marie Caroline, reine de Naples* (1912); *Bull Run* (1913).

JOHNSTON, Samuel (1733–1816). An American jurist, born at Dundee, Scotland, nephew of Gabriel Johnston. His parents emigrated to Chowan Co., N. C., when he was three years old. He was admitted to the bar and was elected to four provincial congresses, over the last two of which he presided. He was moderator of the General Meeting at Newbern in 1775 and by virtue of this office was chief magistrate of North Carolina between the abdication of the last royal Governor and the accession of the first State Governor. From 1780 to 1782 he was a member of the Continental Congress, in 1788 was president of the State convention which rejected the Federal Constitution, and in 1789 was president also of that which ratified it. From 1787 to 1789 he was Governor of North Carolina, and on the expiration of his term of office he was chosen by the Federalists a United States Senator, in which capacity he served from 1790 to 1793. He was appointed judge of the Superior Court in 1800, but resigned three years later and passed the remainder of his life in retirement.

JOHNSTON, W(illiam) Dawson (1871–). An American librarian. He was born at Essex Center, Vt., graduated from Brown University in 1893, and studied at the University of Chicago (1893–94) and at Harvard University (A.M., 1898). He was an instructor in history at the University of Michigan (1894–97) and at Brown (1899–1900), an assistant in the Library of Congress (1900–07), lecturer at Simmons College (1905–07), and served as librarian of the Bureau of Education, Washington (1907–09), of Columbia University (1909–14), and of the Public Library at St. Paul, Minn., after 1914. He is author of *History of the Library of Congress* (1904) and *Special Collections in Libraries in the United States* (1912), with I. G. Mudge.

JOHNSTON, William Preston (1831–99). An American educator, son of Albert Sidney Johnston. He was born in Louisville, Ky., was educated at Centre College, at Georgetown, Ky., and at Yale (1852), and was admitted to the Kentucky bar in 1853. He was commissioned as major in the Confederate army in 1861, served as Jefferson Davis's aid-de-camp, and was captured with him. In 1867 he was chosen professor of history and literature in Washington and Lee University, became president of Louisiana State University in 1880, and first president of Tulane in 1884. He was a regent of the Smithsonian Institution. He wrote a valuable *Life of Albert Sidney Johnston* (1877); several volumes of verse; a genealogy of the Johnstons; *The Prototype of Hamlet* (1890).

JOHNSTON CITY. A city in Williamson Co., Ill., 5 miles north of Marion, on the Illinois Central and the Chicago and Eastern Illinois railroads (Map: Illinois, G 10). It is in a productive coal, fruit, and grain country, and has 17 coal mines within a radius of 4 miles. Pop., 1900, 787; 1910, 3248.

JOHN'STONE. A manufacturing town and police burgh in Renfrewshire, Scotland, on the Black Cart, 11 miles west of Glasgow (Map: Scotland, D 4). It has large manufactories of paper, shoes, iron, brass, machinery, and textiles. Elderslie, the traditional birthplace of Wallace, is a mile to the east. Pop., 1901, 11,155; 1911, 12,045.

JOHNS'TOWN. A city and the county seat of Fulton Co., N. Y., 50 miles by rail northwest of Albany, on Cayadutta Creek, and on the Fonda, Johnstown, and Gloversville Railroad (Map: New York, F 4). It was settled about 1760, was named, in 1771, after Sir William Johnson (whose mansion, erected in 1761–62, is still standing), was incorporated as a village in 1808, and was chartered as a city in 1895. It was the scene of many important councils with the Indians, and in the fall of 1781 a small American force under Col. Marinus Willett defeated here a small British force under Major Rose, the latter losing about 60 in killed, wounded, or captured. Besides Johnson Hall, there are two buildings of historic interest—the courthouse and the jail, both built in 1772. A public-library building has been presented to the city by Andrew Carnegie, and there is an old ladies' home. Johnstown has extensive manufactures of gloves and mittens, leather, knit underwear, baseballs, glovemakers' tools, gelatin, fur coats, shirts, etc. As provided under the original city charter, the government is vested in a mayor, elected every two years, who appoints the chief of police and chief of fire department, and a unicameral council, of which the executive is a member. The school and water boards are independently elected by the people. The city owns its water works. Pop., 1900, 10,130; 1910, 10,447; 1914 (U. S. est.), 10,582. Consult Frothingham, *History of Fulton County* (Syracuse, 1892).

JOHNSTOWN. A city in Cambria Co., Pa., 78 miles east of Pittsburgh, on the Pennsylvania and at the terminus of a branch of the Baltimore and Ohio Railroad (Map: Pennsylvania, D 7). It occupies, at an elevation of about 1300 feet, an area of 7 square miles, being situated in the irregular and narrow valley formed by the confluence of Stony Creek and the Conemaugh River. Among public buildings of note are the Conemaugh Valley Memorial and two other hospitals, the high school, Carnegie library, and the city hall. There are 23 acres of public parks, and Grand View Cemetery is of special interest as the burial place of 800 unidentified victims of the disastrous flood of 1889. The city is well known as the centre of an extensive iron and steel industry, the Cambria Steel Company alone employing some 22,000 men. There are also another large iron and steel plant here, and planing mills, brickyards, fire-clay-products works, breweries, furniture factories, and extensive manufactures of radiators. Coal is mined and shipped in large quantities, and iron ore, fire clay, and limestone are found in the vicinity. Founded in 1791, Johnstown was incorporated in 1889 and adopted the commission form of government in 1914. On May 31, 1889, as a result of heavy rains, the dam across the South Fork, a branch of the Conemaugh River, 12 miles directly east of the city, but more than 18 miles along the stream bed, was carried away, thus releasing Conemaugh Lake, a body of water 2½ miles long, 1½ miles wide at its greatest width, and in many places as much as 100 feet deep. The valley was quickly engulfed, Johnstown and surrounding villages were submerged, 2235 lives were lost, and property worth, according to some estimates, as much as $10,000,000 was destroyed. (See DAMS AND RESERVOIRS.) Aid poured in from all parts of the country, fully $3,000,000 in cash and material being contributed, and the city was quickly rebuilt and has grown steadily. Pop., 1900, 35,936; 1910, 55,482; 1914 (U. S. est.), 64,642.

JOHN WARD, PREACHER. A novel by Margaret Deland (1888), similar in character to *Robert Elsmere.*

JO'HORE. An independent native state, occupying the southern extremity of the Malay Peninsula and embracing an area of about 9000 square miles. It is a progressive state under a sultan, whose foreign relations are controlled by Great Britain. The revenue, derived chiefly from customs dues, exceeds the expenditure by about $1,000,000. The chief products of Johore are rubber, coffee, pepper, gambier, gutta-percha, and sago. Pop., 1912, 180,412, chiefly Moslems.

JOIE DE VIVRE, zhwä de vē̆'vr', LA (Fr., The Joy of Living). A sombre romance by Emile Zola (1884).

JOIGNEAUX, zhwä'nyō̆', PIERRE (1815–92). A French journalist, agronomist, and politician, born at Ruffey-lès-Beaune. He was educated at the Parisian Central School of Arts and Manufactures and entered into political journalism in opposition to the government of Louis Philippe as an editor of the *Journal du Peuple.* For his connection with *L'Homme Libre,* he was put in jail for four years (1838–42) and thus gained the material for *Les prisons de Paris* (1841). Joigneaux became a member of the Constituent Assembly and edited the *Feuille du Village* (1849–51), but was banished to Belgium (1851–59) and on his return occupied himself with writing, chiefly upon agricultural subjects. In 1871 he was elected to the National Assembly, holding his seat until 1889, when he was elected to the Senate. His books include: *Histoire anecdotique des professions en France* (1843); *Les paysans sous la royauté* (1850–51); *Dictionnaire d'agriculture pratique* (1835); *L'Agriculture dans la Campine* (1859); *Légumes et fruits* (1860); *Conseils à la jeune fermière* (1861); *Culture de la vigne et fabrication des vins en Belgique* (1862); *Pisciculture et culture des eaux* (1864); *Nouvelles lettres aux paysans* (1871); *Les ephémérides Joigneaux* (1878); *Monographie de la commune de Ruffey-lès-Beaune* (1888).

JOIN'DER (Fr. *joindre,* OF. *joindre, juindre,* from Lat. *jungere,* to join; connected with Gk. *ζευγνύναι, zeugnynai,* Skt. *yuj,* to join, and ultimately with OChurch Slav. *igo,* Lith. *jùngus,* Goth. *juk,* OHG. *joh,* Ger. *Joch,* AS. *geoc,* Eng. *yoke*). In pleading and practice, the joining or uniting together of parties, issues, or causes of action for the purpose of securing a convenient and complete determination of an entire matter in controversy in a single action.

To entitle persons to be joined as parties plaintiff or defendant in an action, there must be some privity or mutuality of interest between them in respect to the claim or defense. The joining of causes of action in one suit is permitted as a matter of convenience and to save multiplicity of actions. The chief requisite is that they shall be of the same general nature and not be inconsistent.

The phrase *joinder of issue* is also employed to denote the final phase in the process of pleading, when the matter or matters in dispute between the parties to an action have been sifted out from their allegations and admissions and clearly defined. The parties are then said to "be at issue." See ACTION; ISSUE; PLEADING; PRACTICE.

JOIN'ERY. The art of joining or framing together the wooden interior finishings of buildings, such as the doors, windows, shutters, stairs, etc. It is, however, usually confined to dadoes, door trims, and cabinetwork. The term is becoming obsolete. See BUILDING; CABINETWORK; CARPENTRY.

JOINT (OF. *joint, joinct,* from Lat. *junctus,* joint, from *jungere,* to join; connected with Gk. *ζευγνύναι, zeugnynai,* Skt. *yuj,* to join, and ultimately with Eng. *yoke*), or ARTICULATION. In anatomy, the connection existing between any of the denser component parts of the skeleton, whether bone or cartilage. The structures which enter into the formation of the more complex joints are bone, ligament, cartilage, fibrocartilage, and synovial membrane. Bone is the fundamental part of all joints. Ligament is very generally the bond of union between bony segments. Cartilage (either articular, costal, or membraniform) is found as a layer between surfaces or an incrustation upon the opposing ends of bones or as an extension of a bone to reach a given point. Fibrocartilage is either disposed about the circumference of an articular cavity in order to deepen it or is connective or separative. Synovial membranes, when articular, exist as thin sacs containing a little fluid wherewith the joints are lubricated from their position between the opposing bones. Joints vary in their degree of motion. They are arranged in three classes: 1. *Synarthrosis*, or immovable joint, of which there are three varieties. 2. *Amphiarthrosis*, or joint of limited motion, also called "synchondrosis," or "symphysis," of which there are three types. 3. *Diarthrosis*, or freely movable joint, of which there are three varieties.

Synarthrosis is divided into: (*a*) Sutura, in which there is a union of bone by a series of processes and indentations which fit closely together. There are three types of sutura, viz., sutura dentata, where the indentations are large and extensive, as in the joints between the parietal bones of the skull; sutura serrata, where the dovetailing is smaller and more regular, as in the suture between the frontal bones in youth; sutura limbosa, where there are beveled margins and dentated processes, as in the joint between the frontal bone and the parietal; harmonia, in which there is a mere coaptation of two rough bony surfaces, as between the two halves of the upper jaw; and squamosa, formed by thin, beveled margins overlapping each other, as in the squamoparietal suture. (*b*) Schindylesis, in which a thin plate of bone is inserted into a cleft, as where the rostrum of the sphenoid articulates with the vomer. (*c*) Gomphosis, in which a bone is implanted firmly into a socket of another bone, as where the teeth are inserted into the alveolar processes of the jaw.

The three main varieties of diarthrosis are: (*a*) Enarthrosis, or ball-and-socket joint, as in the case of the head of the humerus in the glenoid cavity of the scapula; (*b*) Arthrodia, including all articulations of flat or nearly flat surfaces, as in the joint between the acromion process of the scapula and the clavicle; and (*c*) Ginglymus, or hinge joint, as in the articulation of the bones of the knee, elbow, and ankle. The joints admitting of angular, lateral, or rotary motion are all called ginglymus. Some anatomists call articulation that admits of rotary motion diarthrosis rotatorius.

Amphiarthrosis includes synchondrosis, or union by cartilage, syndesmosis, or union by ligament, and syssarcosis, or union by muscular tissue. As an example of synchondrosis, the union between the two bones of the pelvis, in front, is excellent. This is generally termed the symphysis pubis. Joints admit of the following varieties of motion: flexion, extension, adduction, abduction, rotation, circumduction, and gliding movement. The hinge joints and ball-and-socket joints are most useful in securing flexion and extension; the ball-and-socket joints in securing adduction, abduction, circumduction, and rotation; while arthrodial joints alone secure gliding movement. Consult Cunningham, *Textbook of Anatomy* (New York, 1913).

JOINT. In mechanics and building, a device for, or method of, attaching together two or more pieces of a machine or structure; also the place of such union. Joints are movable or fixed. To the first class belong the hinge (q.v.), pivot, and swivel, the compass joint and rule joint, the knee or toggle joint, ball-and-socket and universal joint, all of which permit a partial rotation in one or more directions of one of the members. A swivel is a link with a stem pivoted into a ring or seat; a rule joint and compass joint are designed to secure great rigidity of rotation in the plane of the two members, the first by multiple small knuckles and a long pin, the second by a short pin and broad, flat knuckles.

Pipes are joined end to end in various ways: by flanges bolted together (flange joint), by the insertion of the tapered end of one into the flared bore of the other, by screw-threaded couplings and unions, by wiped joints of melted solder (for lead pipes only), and, where the direction of the pipes changes at the joint, by one-eighth turns, quarter turns, etc. A tee joins two pipes in a line to a third at right angles.

In carpentry a butt joint, or abutment joint, is one where the end of one piece abuts against the end or side of another; a mitre joint unites two pieces at an angle, the ends being cut to meet in a plane which bisects that angle. When a round or square projection (tenon) on the end of one piece fits into a corresponding hole (mortise) in the other, the joint is a mortise and tenon. When one-half the thickness of each piece is cut away so that at their junction the two pieces are flush, they are said to be halved into each other. A halved joint between two pieces in the same straight line is a lap joint. If the meeting surfaces are cut to a slight angle with the axis of the timbers and provided with projections or serrations that engage into each other, they form a scarf joint, which is generally locked by a wedge or key. In masonry, in floor laying, and in lathing, to break joints is to arrange the vertical or the end joints so that no two (or in lathing no more than five or six) in consecutive courses shall be in a continuous line.

In steel construction, columns, beams, etc., are secured at the joints either by fishplates, angles, or specially shaped pieces, riveted to each of the meeting pieces, or, in the case of bridge trusses and roof trusses, sometimes by pin joints. See BUILDING; CARPENTRY; MASONRY.

JOINT ADVENTURE, ENTERPRISE, or **TRADE.** A phrase sometimes applied to a business undertaking by two or more persons, in the nature of a partnership, but which is limited to a single transaction or set of transactions. The expression is more commonly used, however, of joint undertakings in which the essential element of partnership—a business carried on in common with a view to profit—is wanting. An example of this use is afforded by an agreement between the owner of an invention and another to take out a patent in their joint names and sell the right to use it, dividing the profits. Such persons are not carrying on a business, but are engaged in a joint adventure. Pooling arrangements between competitors in business are ordinarily joint enterprises and not partnerships. Each competitor remains sole owner and manager of his separate business, while all are jointly interested in the pool made up of their various earnings. Consult the authorities referred to under PARTNERSHIP; CONTRACT.

JOINT ILL, or OMPHALOPHLEBITIS. An acute infectious disease of newborn animals, principally colts and calves, occurring in the first few days of life and not later than the first four weeks. The symptoms consist in swelling of one or more joints and of the navel. The animals are stiff and lie down the greater part of the time. High fever and rapid pulse and breathing are characteristic. The disease arises from infection in the navel at the time of birth or soon after, and a purulent discharge from the navel is seen in all advanced cases. The infection spreads through the umbilical vein, and abscesses may ultimately be formed in the muscles near the navel or even in the lungs and liver. The majority of such cases end in death. In order to prevent the occurrence of the disease the stables should be kept clean and the navel should be treated with an antiseptic solution immediately after birth. Swollen joints may be daily painted with tincture of iodine; internal doses of quinine and hyposulphite of soda three times a day sometimes give good results. Consult F. Hutyra and J. Marek, *Special Pathology and Therapeutics of the Diseases of Domestic Animals*, vol. i (Chicago, 1912), and E. W. Hoare, *A System of Veterinary Medicine*, vol. i (ib., 1913).

JOINT LIABILITY. A mutual or common responsibility of two or more persons for some act or duty, which so binds them all that one cannot be held or released without the others. It is the direct opposite of "several liability," where an individual is bound personally, irrespective of his relations to others. Persons more frequently become jointly and severally liable on a bond or other obligation. In such cases the obligee or owner of the bond or obligation can sue either separately or both together at his option. Where judgment is recovered against persons jointly, and not severally, liable, the judgment creditor can levy execution against the goods of either or both of them at his option, but can have only one satisfaction. In either of the above cases, if the judgment is satisfied out of the goods of one, that one is entitled to contribution (q.v.) from the other, i.e., to be reimbursed the proportionate share the other should have paid; and this right he can enforce by action.

At common law the death of one joint obligor terminated his liability, and the survivor or survivors continued solely liable; but this rule is now changed in most jurisdictions by statute, and the estate of the deceased is liable for his share. In the absence of statutes to the contrary the discharge of one person jointly liable by operation of law, as by bankruptcy, does not release the others even for the proportionate share of the bankrupt. See CONTRACT; BOND.

JOINT OWNERSHIP. A general expression for the ownership by two or more persons, in common, of one and the same piece of property. The ownership of any property, real or personal, may be thus shared. The expression is not of precise legal signification, but is generally employed to include such various forms of common ownership as joint tenancy, tenancy in common, parcenary, and tenancy by entireties, and sometimes, also, the ownership of property by partnerships and unincorporated joint-stock associations. These differ greatly in their characteristics and in the nature of the rights which they confer, but they all have the common characteristic that each individual owner's interest is an undivided share of the entire property affected and not a definite part or parcel of the whole. The various forms of joint ownership are considered under their appropriate titles. See also OWNERSHIP; PROPERTY.

JOINTS. A name given to the divisional planes which traverse rocks, separating them into irregular prismatic blocks. All consolidated strata, whether of igneous or sedimentary character, are broken by joints, although some variations are observable depending upon the different rock materials. In sedimentary rocks the joints are usually arranged in two series that intersect each other at a high angle and are approximately perpendicular to the bedding planes. When the strata are inclined, one series in most cases trends with the dip, while the other follows the direction of the strike, thus giving rise to the classification of dip joints and strike joints. In igneous rocks there is a wider range in the number and direction of the joint planes. Granite and other coarse-grained rocks of igneous nature are often traversed by two sets of perpendicular joints forming columns and by a third set intersecting the other two and articulating the columns into segments. The finer crystalline masses such as basalt exhibit a great number of joints so arranged as to form complex polygonal prisms of remarkable regularity. This is well shown in the illustrations of Fingal's Cave (see STAFFA) and Giant's Causeway (q.v.). Jointing is of great assistance to quarrying operations; the rock is readily removed in blocks, which could be obtained by sawing or blasting only with difficulty. The cause of joints is variously explained as the result of contraction of rocks upon cooling or drying, of earthquake shocks, and of compression strains. See GEOLOGY.

JOINTS, COMPARATIVE ANATOMY OF. Among invertebrate animals there are many cases of articulation which indicate the presence of joints, but they are mostly confined to that type which is characterized by the presence of jointed appendages, the arthropods. Among the worms we find nothing to which the word "joint" can properly be applied, the relation of the successive segments to each other not justifying the term. It is even open to question whether the relationship of the segments in the arms of crinoids and brittle stars is such that the word "joint" ought to be used. The joints are generally very simple, consisting merely of the connecting of successive skeletal pieces by strips of connective tissue or muscle. In crinoids we find a very peculiar joint, the syzygy, which occurs at more or less regular intervals throughout the length of the arm and may also occur in the stalk. A syzygy has been defined as a joint in which the two skeletal pieces "are closely and immovably fitted together, though they can be separated by alkalies." If the union is still more complete, so that alkalies will not separate the pieces, the result is called ankylosis. In sea urchins we find excellent examples of true joints, in the attachment of the spines to the test by means of ball-and-socket joints, the base of the spine being hollowed out to fit smoothly over a polished tubercle and held in position by a band of muscular and connective tissue. Although the spines of many starfishes show considerable mobility, there is seldom any well-marked joint. The only example of joints among mollusks would seem to be in the connection between the eight pieces of the chiton's shell or in the hinge of a bivalve shell, but these are hardly worthy the designation. Among arthropods (insects, arachnoids, and crustaceans) joints abound, for not only are the antennæ and feet jointed appendages, but even the mouth parts and the wings work upon joints. In all these cases, however, there are no skeletal ossicles, the segments being merely sections of the uniformly inclosing exoskeleton, with the muscle or connective tissue strands within themselves. The freedom of movement is rendered possible by the marked thinning of the exoskeleton at the joints into a delicate, flexible membrane, while muscles pass from each joint into the next one.

Among vertebrates the various joints are of the same general structure and plan as in man, varying with the degree of ossification and the complexity of the organs concerned.

JOINTS, Diseases of the. Attempts have been made to classify these diseases according to the anatomical condition, as diseases of the cartilage (*chondritis*), the articular capsule (*synovitis*), or of the bone (*osteitis*); but practically the surgeon views inflammation of the joint as a whole, and uses the term *arthritis* oftener than the others. Diseases of the joints are caused by cold, injuries, gout, syphilis, tubercle necrosis, or caries. Water on the knee is the popular name for chronic synovitis of the knee joint, in which there is an effusion of fluid into the synovial cavity. White swelling is the popular name for tubercular arthritis. Dislocation may follow some joint diseases; suppuration may accompany some; while in other cases adhesions growing in the joints may cause fibrous ankylosis, or stiffened joint, or in still other cases denuded articular ends of bones may join together forming bony ankylosis with permanent immovable joint. Rest is the first treatment for a diseased joint, pain being a danger signal that counterindicates activity. Hot and cold affusions to the joint, alternately, with evaporating lotions, are useful in some cases; but domestic treatment of a joint, in ignorance of the conditions, is always hazardous. Even in the hands of competent surgeons many joint diseases are very slow in resolving. See Knee Joint; Arthritis; Gout; Rheumatism; Synovitis.

JOINT-STOCK COMPANY, or **ASSOCIATION.** An association of individuals who unite to carry on business for gain, each taking and holding shares in the common stock. At common law it is a partnership (q.v.) and is subject to the rules of partnership law, and especially to the rule which binds each partner individually to liability for the debts of the firm. It differs from the ordinary partnership, however, in three important respects: 1. Its capital stock is divided into transmissible shares; i.e., any shareholder can sell his shares to a third person, who becomes at once a member of the association, without the assent of the seller's partners. 2. The death of a shareholder does not dissolve the company. 3. The conduct of a joint-stock company's business is always limited to a few persons. A shareholder has, as such, no implied authority to act for the company. In order to bind it he must be designated as a manager, or in some other way receive authority to act for it.

At present, both in England and in the United States, joint-stock companies are generally organized under statutory provisions. The tendency of such statutes is to assimilate these companies to corporations, without really transforming them into artificial persons. In England legislation has gone further in this direction than in the United States. By the Companies Act of 1862 (25 and 26 Vict., c. 89) and acts amendatory thereof it is provided that "any seven or more persons associated for any lawful purpose may, by subscribing their names to a memorandum of association, and otherwise complying with the requisition of the act in respect to registration, form an incorporated company with or without limited liability." If the proposed company is to be an association of limited liability, the word "Limited" must be added to its title. Since the enactment of this legislation joint-stock companies have multiplied and flourished remarkably in England.

They have not gained equal popularity in the United States partly because the organization of corporations under general laws is much easier than in Great Britain, and partly because of the introduction of limited partnerships during the last century. While State legislation varies in matters of detail, it generally provides for the organization of joint-stock companies by the execution of certain written articles of association by the shareholders, and the filing of these articles in designated public offices. Their business is managed by directors and officers duly elected and announced. Actions may be maintained by the company in the name of some designated officer or officers and against the company in such name. When a judgment is obtained against the company in a suit of this kind, execution is issued against the company's property, and not against the officer named as the representative of the company, nor against the property of shareholders. Oftentimes the company is allowed to sue its members, as though they were strangers. But, as a rule, the partnership liability of each shareholder for all the debts and liabilities of the company has not been modified by our legislation. They may be dissolved by the mutual consent of all the shareholders, as in the case of an ordinary partnership, or by a decree of a court in a proper proceeding brought for that purpose. Consult: Lindley, *The Law of Companies* (London, 1889); Hurrell and Hyde, *Law of Joint Stock Companies* (ib., 1898); Birdseye, *New York Statutes*, title "Joint Stock Associations" (New York, 1901); Heinrich Lomnitz, *Die systematische Bearbeitung der Veröffentlichungen von Aktiengesellschaften* (Leipzig, 1908); W. R. Scott, *The Constitution and Finance of English, Scottish, and Irish Joint-Stock Companies to 1720*, vols. i–iii (Cambridge, 1910–12).

JOINT TENANCY. A form of common ownership of real or personal property, in which each owner is conceived of as owning the whole as well as an undivided and proportional share of the property. This is described by the quaint and untranslatable expression that the ownership is *per my et per tout.* It is of a curiously limited character and can exist only when there is a unity of interest, time, title, and possession; i.e., when the owners have identical interests, accruing by one and the same conveyance, commencing at one and the same time, and held by one and the same undivided possession. They must all hold upon one and the same conditions in every respect, each of them being regarded as having possession of every parcel and of the whole estate, not indeed for every purpose, but in respect of tenure and survivorship. For the purpose of alienation each joint tenant has a right only to his undivided relative share of the property, and the purchaser of such right does not succeed to the position of the seller as a joint tenant, but becomes a tenant in common with the survivors of the joint tenancy who have not alienated their shares. If there are two tenants, each may dispose of an undivided half; if four, an undivided quarter, and so on; but the purchaser cannot enter upon the exclusive possession of his share, for the estate must remain undivided, subject to an entirety of interest on the part of each of the remaining joint tenants, and to what is called the principle of survivorship, by which is meant the right of the last survivor to the whole property. In other words, when one of several joint tenants dies, his share passes to the survivors, and so on until the last survivor takes the whole interest, whatever it may be, and upon his death it will pass to his heirs. This right of survivorship—or *jus accrescendi*, as it is called—is the principal and characteristic incident of a joint tenancy.

An estate in joint tenancy cannot arise by descent or operation of law, but only by purchase or acquisition, as a grant, a devise, or a disseisin. In America such tenancy is comparatively uncommon, the law presuming nothing in its favor, but inclining rather towards tenancy in common, which excludes the principle of survivorship and implies that the estate may be divided and each tenant take his proportionate share. By the common law, indeed, any conveyance to two or more persons without qualification was presumed to be in joint tenancy; but by statute in many American States this presumption has been reversed, and such a conveyance declared to be a tenancy in common unless the deed creating it contains an express statement to the contrary. An exception is, however, generally made in favor of conveyances to executors or trustees, which are still deemed to be in joint tenancy. Joint tenants are regarded in law as a single owner as respects third parties, and they must therefore all be joined in any suits that concern their joint estate. Possession by one tenant is deemed the possession of all, and a conveyance to one a conveyance to all. Consult: James Kent, *Commentary on American Law* (14th ed., 4 vols., Boston, 1896); Sir William Blackstone, *Commentaries* (4th ed., 2 vols., Chicago, 1899); Tiffany, *The Modern Law of Real Property* (St. Paul, 1903). See ENTIRETY, TENANCY BY; JOINT OWNERSHIP; COMMON, TENANCY IN; PARCENARY.

JOIN'TURE (OF., Fr. *jointure*, from Lat. *junctura*, a joining, from *jungere*, to join). A settlement made on a wife or on the husband and wife jointly, to be taken by her in lieu of dower (q.v.) if she survive her husband. It arose during the period of English history when the dower right of the married woman was in abeyance owing to the prevalence of the practice of conveying lands to the use of persons who were not the legal owners. (See DOWER.) Jointure derived its name from the fact that it was a conveyance to the husband and wife as joint tenants with the benefit of survivorship. When the Statute of Uses (27 Hen. VIII, c. 10) transferred the legal title in lands to all who had the use or beneficial ownership, its immediate effect was to revive the dower right of the wife in all such lands. As this would have resulted in giving her a double provision, the same statute compelled her to choose between her jointure and her dower. She could not have both. In this form the jointure has survived in England and in many of the United States, though the practice of settling a jointure upon married women is less common in America than in England.

The expression *equitable jointure* is applied to a similar provision made for the wife under circumstances which do not entitle her to legal jointure as described above. It is, in effect, an extension of the doctrine of jointure effected from motives of humanity and justice by courts of equity. Equitable jointure does not require so many formalities as legal jointure, but in a court of equity any provision made for the wife before the marriage, and then assented to and accepted by her as a jointure, may effectually bar her dower. In that court proof of her assent given before the marriage obviates the necessity of showing that the formalities prescribed by the Statute of Jointures have been complied with. If she be a minor, such assent may be properly given by herself and her guardian or parent. If the jointure, whether legal or equitable in its nature, be not settled upon the wife until after the marriage, it is no further binding upon her than that she must elect at the husband's death to take it in lieu of dower or to take her dower. In some of the United States she is required by statute to make such election within a prescribed time—usually one year—after the husband's death, or, if she do not so elect, she is conclusively presumed to have accepted the jointure. In some States also legal jointure is abolished, and only such as is equitable, i.e., made with her consent before marriage, can absolutely bar her dower. Substantially the same causes may operate to bar jointure as those which may defeat dower; but at law a wife does not lose her jointure, as she would her dower, by eloping and living in adultery, since it is not a mere incident of the marriage relation, but is an interest in land, vested in the woman as her sole and separate property. Consult Sir William Blackstone, *Commentaries on the Laws of England* (4th ed., 2 vols., Chicago, 1899). See DOWER; HUSBAND AND WIFE; MARRIAGE.

JOINT'WORM. Any of several hymenopterous insects of the family Chalcididæ and genus *Isosoma*, and particularly the wheat jointworm (*Isosoma tritici*) and the jointworm of barley (*Isosoma hordei*). The jointworms, although belonging to a family of parasitic insects, are true gall makers, and their larvæ make oblong swellings or enlargements in the stems of wheat, barley, and other small grains or grasses. The galls are commonly found at or near the joints and more frequently in the second joint. The adult insects are small, black, four-winged flies, averaging about ⅛ of an inch in length. The galls usually occur in groups of three or four or more, distorting and greatly weakening the stem. About 40 species are known in the United States. The best remedy consists in burning the stubble after harvest. Cf. GALL INSECTS.

JOINVILLE, zhwăN'vēl', FRANÇOIS FERDINAND D'ORLÉANS, PRINCE DE (1818–1900). Third son of Louis Philippe, King of France (1830–48). He was born at Neuilly, Aug. 14, 1818, was educated at the naval school at Brest, and was made a naval lieutenant in 1838. In 1840 he commanded the frigate *La Belle Poule*, which bore the body of Napoleon from St. Helena to France. In 1843, at Rio de Janeiro, he married Francesca, sister of the Brazilian Emperor, Pedro II. In the same year he was made rear admiral. In 1844, in the war with Morocco, he commanded the French squadron at the bombardment of Tangier and the taking of Mogador and was made a vice admiral. With the other members of the royal family, he took refuge in England after the revolution of 1848. In 1861, with his son, the Duc de Penthièvre, and his nephews, the Comte de Paris and the Duc de Chartres, he went to the United States, where they joined the staff of General McClellan. The course of France in Mexico, however, made Frenchmen unpopular, and the Prince returned to England in 1862. In 1870 he returned to France and, being forbidden to remain in the country, served under the name of Colonel Lutherod in the fighting about Orléans. He was arrested by order of Gambetta, confined five days in the fortress of Mans, and then sent to England. Being relieved of his political disabilities, he entered the Assembly as a Deputy from Haute-Marne in 1871. He retired from public life in 1876 because of growing deafness and was again sent into exile by the Law of 1886 against the royalist families. He returned to France in 1895 and died June 16, 1900. He was a man of considerable and varied talent, a capable military and naval officer, and a writer of ability. Most of his essays in the *Revue des Deux Mondes* appeared in book form as *Essais sur la marine française: L'Escadre de la Méditerranée* (Paris, 1853) and *Etudes sur la marine et récits de guerre* (1859; 2d ed., 1870). He also published a book on his experiences in the Civil War, *La guerre d'Amérique, campagne du Potomac* (1872). Of interest especially as to the French revolution of 1848 are his recollections published in 1894 under the title *Vieux souvenirs, 1818 à 1848.*

JOINVILLE, Jean, Sire de (1224–1317). A great French chronicler, hereditary seneschal of Champagne, and Governor thereof during the minority of Jeanne de Navarre, at whose request he wrote or completed his *Histoire de Saint Louis.* He was of a family illustrious in the second, third, and fifth crusades. Reared at the literary court of Thibaut of Champagne, he was already married and father of two children when at 24 he joined at Cyprus Louis IX on his first (the Egyptian) crusade (September, 1248). Joinville was wounded at Mansurah in 1250 and taken prisoner, but after a month he was ransomed. He remained in Egypt and Syria till 1254. The experience satisfied him, and he declined to accompany the King on his crusade to Tunis in 1267. In 1283 Philip III made him Governor of Champagne. His *Histoire,* though made at the request of Jeanne, then Queen, was presented four years after her death (1309) to her son, the future Louis X. There is a letter of 1315 in which Joinville, then over 90, offers to join that King in a campaign against Flanders. He died on Christmas Eve, 1317. At Saint-Jean d'Acre Joinville wrote his *Credo* (1251), a sort of commentary on the Creed, and he recast it in 1287. He was also fond of annotating autographically the papers of his chancellery; and it is now thought, contrary to earlier opinion, that the kernel of his *Histoire* consists, not of the recollections of an old man, but of notes taken during the Egyptian crusade or of personal memoirs written probably soon after 1272. To these memoirs, retouched and expanded, the anecdotal history of the already venerated King was added by the aged Joinville at royal request, probably in 1305. In the later parts there are traces of senility; the memoirs are the work of a keen observer and a born narrator. Here, says Langlois, Joinville reveals himself fundamentally good, straightforward, cautious, filled with an ideal of duty, brave though not fond of blows, careful of his interests and his ease, a jealous conserver of tradition, with just a trace of aristocratic pride and personal vanity, but yet full of good sense, good humor, and dry wit. If Joinville had not written, the classic, popular figure of St. Louis would not be what it is, and there would be something lacking in the history of France. Yet there are but these manuscript copies of the *Histoire,* which for two centuries seems to have been quite forgotten. The works of Joinville were first edited by Antoine de Risux in 1547, and best by Natalis de Wailly in *Jean de Joinville: Histoire de Saint Louis, Credo et Lettre à Louis X,* with a modernized version (Paris, 1874).

Bibliography. Jules Fériel, *Jean, Sire de Joinville, Sénéchal de Champagne* (Chaumont, 1853); Gaston Paris, in his *Littérature française au moyen âge* (Paris, 1893); Delaborde, *Jean de Joinville et les Seigneurs de Joinville* (ib., 1894); and Gaston Paris in *Romania* (ib., 1894); Fitzjames Stephen, *Horæ Sabbaticæ* (London, 1891; English trans. by F. T. Marzials, ib., 1908); *Memoirs of the Lord of Joinville* (new Eng. version by E. Wedgwood, New York, 1906).

JÓKAI, yō'kō-ĭ, Maurus (Hung. *Mór*) (1825–1904). A famous Hungarian writer of fiction, born at Komorn (Komárom) Feb. 19, 1825. At Pápa he made the acquaintance of Petőfi (q.v.), with whom he entered into a lasting friendship, the two being the leaders of the young Nationalist party during the revolutionary days of 1848. On March 15 they fought for the "twelve articles" (freedom of the press, etc.). Though admitted to the bar in 1846, he never took up law practice, but devoted himself to literary pursuits. As early as 1842 he composed his first drama, *A Zsidó fiú* (*The Jew Boy*), and published in 1846 his first novel, *Hétköznapok* (*Working Days*), which at once became popular. In 1847 he assumed the editorship of the weekly *Eletképek* (*Pictures from Life*), which molded public opinion and guided the minds during those days of social ferment. Two volumes of his tales, *Vadon virágai* (*Wilderness Flowers*), appeared during the same year and attracted general attention to the rising author. After the revolution was crushed out, he was imprisoned at Világos (in 1849), whence after many hairbreadth escapes he was safely brought to Pest by his devoted young wife, later the famous tragic actress Rosa Laborfalvy. These troublous days he described in his *Forradalmi és csataképek* (1849, *Revolutionary Battle Pictures*), followed by a series of novels dealing with the history of Hungary. Of these works the following are best known: *Erdély arany kora* (1851; trans. by Nisbet Bain as *The Golden Era of Transylvania*); *A két szarvu ember* (1852, *The Two-Horned Man*); *Tőrők világ Magyarországon* (1852; Eng. trans., *The Turks in Hungary*); *Egy magyar nábób* (*An Hungarian Nabob*), one of his best novels, describing the life of wealthy Hungarians, "who lived like little potentates in prerevolutionary times"; its sequel, *Kárpáthy Zoltán* (1854, *The Carpathian Sultan*), full of pathos and humor; *A köszivü ember fiai* (*The Sons of a Heartless Man*); *Politikai divatok* (*Political Fashions*); *Mégis mozog a föld* (1866, *And Yet the Earth Moves*); *Az új földesúr* (*The New Landlord*, trans. by A. Patterson, London, 1865), admittedly his masterpiece as regards form and structure; *A jövő század regénye* (1874, *The Romance of the Next Century*); *A ma* (1881, *Our Days*); *Fekete gyémántok* (*Black Diamonds,* trans. into English); *Mire megvénülünk* (*What we are Growing Old for*); *Szerelem bolondjai* (*Love's Fools*); *Ninosen ördög* (*There is No Devil*, trans., New York, 1891); *Rákóczy fiu* (*The Son of Rákoczy*); *Az arany ember* (*The Man of Gold*, trans. as *A Modern Midas*, New York, 1886); *Kétszer kettő négy* (*Twice Two is Four*); *A Tengerszemü hölgy* (1890, *Eyes Like the Sea*). Of his numerous dramas, *King Kolomán* (1855), *Manlius Sinister* (1856), *George Dózsa* (1858), *The Martyrs of Szigetvár* (1859), and *Milton* (1878) met with the greatest favor. Jókai's *History of Hungary* (1884) is held in high repute. From 1858 till 1881 he was contributor to and editor of the leading humorous weekly, *Ustökös* (*Comet*), at Budapest; founded the political daily *Hon* (*Fatherland*) in 1863, and became editor in chief of *Nemzet* (*The Nation*) in 1894.

He was elected to the Hungarian Academy in 1858, became a member of the Kisfaludy Society in 1860, and was president of the Petőfi Society after 1878. The fiftieth anniversary of his literary activity was celebrated throughout Hungary in 1894, and an *édition de luxe* of his works was issued in 100 volumes; this edition is, however, far from including all Jókai's literary productions. A supporter of Tisza, Jókai was many times reëlected to the Lower House of the Hungarian Parliament until January, 1897, when he was called by Emperor Francis Joseph to the House of Magnates.

Alert and keen to what was going on in the world, he reflected in his methods the various literary currents prevailing in European literature. Thus, avowedly a pupil of the French Romanticists, particularly Victor Hugo and Alexandre Dumas, at the beginning of his literary career, he became a strong champion of the Realistic school during the last two decades of the nineteenth century. Written in a rich and racy language, vivid in fancy, rich in humor, absorbing in plot, his works are often open to criticism owing to the special nature of his gifts and the rather crude psychology of his heroes; but his writings present a splendid panorama of the political and social life of Hungary, particularly during the nineteenth century, and more especially the period of his country's regeneration (1825–48), the revolution, and the epoch of reaction. Consult L. Névy, *M. Jókai* (Budapest, 1894); R. N. Bain, "Maurus Jókai," in the *Monthly Review*, vol. iv (London, 1901); Temperley, "Jókai and the Historical Novel," in the *Contemporary Review*, vol. lxxxvi (ib., 1904); Emile Horn, "Maurice Jókai," in *Le Carnet*, vol. xix (Paris, 1904); M. Kalmán, *Jókai Már Elete és kora*, part i (Budapest, 1907).

JOKJAKARTA, jŏk'jȧ-kär'tȧ, or Djocjakarta. The capital of a native vassal state on the island of Java, Dutch East Indies, pleasantly situated a short distance from the south coast, 260 miles by rail east-southeast of Batavia (Map: East Indies, D 7). It is a regularly built and fortified town, and the seat of the native Sultan and of the Dutch Resident. Pop., 1900, 72,235; 1905, 79,567. In the vicinity is a magnificent water palace, constructed about 1750. Its paradise gardens and beautiful lakes with luxurious water chambers were the resort of the former sultans in their leisure hours. It is now decayed and visited only by tourists.

JOK'TAN (Heb. *Yoḳṭān*). According to Gen. x. 25–30, son of Eber, a descendant of Shem, and progenitor of the older Arabian tribes. In the tradition of the Arabs, Joktan is identified with Kahtan, the ancestor of the South Arabian clans. The traditions are not thought to have historical value.

JO'LA, or **FEL'LUP.** Negroes along the Gambia River, on the extreme west coast of Africa. They belong to the Mande, Mandingan, or Mandenke linguistic group. They are true negroes, tall (67 inches in stature), dolichocephalic, and not at all attractive. Both sexes wear little or no clothing. They are the principal tribe in the region and have imposed their dialect upon other Mandingan tribes in the neighborhood. In some locations they are spoken of as gentle, frank, and honest; in others they are said to be cruel and always at war with their neighbors. In their own country there is neither law nor government, nor any formality in marriage. Consult Madrolla, *En Guinée* (Paris, 1895). See also Mandingo.

JO'LIBA. A river of Africa. See Niger.

JOLIBOIS, zhô'lē'bwä', Claude Emile (1813–?). A French archæologist, born in Chaumont-en-Bassigny and educated there. In 1845 he was made professor of history in the Colmar Lyceum, but was dismissed four years later on account of his political views, which involved him in further trouble through the promulgation of them in his newspaper, *Le Républicain du Rhin*, which was suppressed. He was imprisoned (1851–53), upon his release took up his abode in Paris, and in 1859 was made archivist of the Department of Tarn, where he gained medals and honors for the literary work done in connection therewith. His publications include: a translation of *Chroniques de l'évêché de Langres* (1843); *L'Histoire de la ville de Rethel* (1846); *L'Histoire de la ville de Chaumont* (1856); *La roue de fortune* (1857), which is the translation of the fourteenth-century genealogical romance; *La Haute-Marne ancienne et moderne* (1861); *L'Histoire des consuls de la ville d'Albi* (1865); *Albi au moyen âge* (1871); *Dévastation de l'Albigeois par les compagnons de Montluc* (1872).

JO'LIET. A city and the county seat of Will Co., Ill., 37 miles by rail southwest of Chicago, on the Des Plaines River and the Illinois and Michigan Canal, and on the Chicago and Alton, the Atchison, Topeka, and Santa Fe, the Chicago, Rock Island, and Pacific, the Elgin, Joliet, and Eastern, the Chicago, Milwaukee, and Gary, the Chicago, Ottawa, and Peoria, and the Michigan Central railroads (Map: Illinois, H 2). Four miles from the city is the new Illinois State Penitentiary, covering 4000 acres, and there are a public library, St. Joseph's and Silver Cross hospitals, the Illinois Steel Company's Athenæum, a clubhouse for working men, and St. Francis and St. Mary academies. The township high school, which cost about $250,000, is a large building, splendidly equipped. The city contains also Bush and Dellwood parks. Industrial interests are represented by plants of the Illinois Steel Company, American Steel and Wire Company, and the American Sheet and Tin Plate Company, and by stove and boiler works, machine shops, agricultural-implement works, engine, match, box, pottery, brick, and chemical factories, etc. Several of the largest limestone quarries in the United States are here. The manufacturing is largely promoted by power from the river and canal. Joliet is governed by the commission form of government, with a mayor and four commissioners, elected every four years. The town, named after the famous explorer, was settled about 1831 and was organized as a city in 1852. It owns the water works. Pop., 1900, 29,353; 1910, 34,670; 1914 (U. S. est.), 36,934.

JOLIET, zhō'lyā', Charles (1832–1910). A French journalist and author. He was born at Saint-Hippolyte-sur-le-Doubs in the Department of Doubs and was educated at the College of Chartres and the Lyceum of Versailles. In 1854 he entered the civil service. He varied his official labors by dilettante journalism and in 1859 published *L'Esprit de Diderot*. His anagrammatic pseudonym, J. Telio, became well known, and in 1864 he abandoned his official position and thenceforward devoted himself to journalism and miscellaneous literature. His early successes were *Le roman de deux jeunes mariés* (1866) and *Mademoiselle Chérubin* (1870). His fame was enhanced during the Franco-German War (1870–71), and subsequently, by his novels treating of incidents during that turbulent period. Among the more important of these are: *Les romans patriotiques* (1871); *Le train des maris* (1872); *Trois uhlans* (1872); *La foire aux chagrins* (1873). His later works include: *Carmagnol* (1876); *La vipère* (1880), a study of a woman; *Le crime du pont de Chatou* (1882); *Le médecin des dames* (1885); *Violette* (1890), portraying the miseries and splendors of an actress; *Nouveaux jeux d'esprit* (1892).

JOLIET, Louis (1645–1700). An explorer of the Mississippi valley. He was a Canadian by birth and was educated for the priesthood in the Jesuits' College at Quebec. His inclination drew him towards the woods, and he soon became known as a voyageur. In 1669 he went with a party to search for copper on the shores of Lake Superior and to discover a more direct route from the upper lakes to Montreal. He penetrated as far west as Sault Ste. Marie. In 1672 Joliet was selected by Frontenac, then newly appointed Governor of Canada, to explore the course of the Mississippi, which was supposed to flow into the "Sea" of California. In December he reached Mackinaw, where he found Père Marquette (q.v.), and remained during the winter. The voyage of exploration was continued in the following May. Seven men in two birch-bark canoes ascended the Fox River, crossed the portage to the Wisconsin, and, sailing down that stream, on June 17 entered the Mississippi, which they descended as far as the Arkansas River. Satisfied that the Mississippi flowed into the Gulf of Mexico and not into the Pacific Ocean, they returned to Quebec by way of the Illinois River and Lake Michigan. Joliet's canoe had been overset in the Lachine Rapids, and all his maps and papers lost, but from memory he drew a map of the discoveries he had made, of which a facsimile is given in Winsor's *Narrative and Critical History*, vol. iv, pp. 208, 210. He was presented with the island of Anticosti and built a fort there. In 1693 he was appointed Royal Hydrographer and in 1697 was granted the seigniory of Joliet, south of Quebec, which is still in the possession of his descendants. Consult: Shea, *Discovery and Exploration of the Mississippi Valley* (New York, 1852); Parkman, *La Salle, or the Discovery of the Great West* (Boston, 1879); Gagnon, *Louis Jolliet* (Quebec, 1902); and for a consideration of the first discovery of the Mississippi, Winsor, *Cartier to Frontenac* (Boston, 1894).

JOLIETTE, zhō-lyĕt'. The capital of Joliette Co., Quebec, on L'Assomption River, 36 miles north by east of Montreal, on the Canadian Northern and the Canadian Pacific railways (Map: Quebec, E 4). It has a Roman Catholic cathedral, a classical college, academies for boys and girls, a hospital, and two orphan asylums. Among its manufacturing establishments are saw, lumber, and grist mills, a biscuit factory, five tobacco factories, two woolen mills, a chemical factory, two paper mills, a sash and door factory, a brewery, and steel and iron foundries. Pop., 1901, 4220; 1911, 6346.

JOLIN, yō-lēn', Johan Kristofer (1818–84). A Swedish dramatist born in Stockholm. From 1845 to 1868 he was an actor in the Stockholm Theatre and during the latter part of this time was reader and director of the dramatic school. He adapted and translated a number of plays, besides writing several himself, such as the dramas *Mäster Smith* (1847), *Barnhusbarnen* (1849), and *Mjölnarfröken* (1865) and the comedies *En man af verld och en man af värde* (1846), *Min hustru vill ha roligt* (1868), and *Smålands-Petter* (1883), noted for their wit, vivacity, and clever stagecraft. He was also the author of some novels and sketches and a prize poem (1845). His complete works were published in three series, the first in 1872–81, six volumes; the second in 1882–83, five volumes; and the third in 1888.

JOLINE, jō-lēn', Adrian Hoffman (1850–1912). An American lawyer and writer, born at Ossining, N. Y. He graduated from Princeton University in 1870, studied at Columbia Law School, and was a member successively of various law firms. He became a leader at the bar in questions relating to railroad litigation, trusts, mortgages, and reorganizations, served as general counsel and director of many railroad and other corporate interests, and was receiver of the Metropolitan Street Railway Company of New York City. Joline attracted attention just previous to the presidential campaign of 1912 by the publication of a letter received by him from Woodrow Wilson in 1905, in which Wilson had said, "Would that we could do something at once dignified and effective to knock Mr. Bryan into a cocked hat." An enthusiastic book and autograph collector, Joline published: *Meditations of an Autograph Collector* (1902); *Diversions of a Book Lover* (1903); *At the Library Table* (1910); *Edgehill Essays* (1911); *Rambles in Autograph Land* (1913). His library and autograph collections were sold at auction in 1914.

JOLLY, yōl'lē, Friedrich (1844–1904). A German physician, born at Heidelberg, son of Philipp von Jolly. He studied at Munich and Göttingen. In 1871 he became privatdocent at Würzburg, and in 1873 he went to Strassburg as professor of psychiatry and director of the psychiatrical clinic. There he remained until 1890, when he accepted a similar position at the University of Berlin. Among his publications are: *Bericht über die Irrenabteilung des Juliusspitals* (1873); *Untersuchungen über den elektrischen Leitungswiderstand des menschlichen Körpers* (1884); *Ueber Irrtum und Irrsinn* (1893). For several years after 1890 he was editor of the *Archiv für Psychiatrie und Nervenkrankheiten*, and his later writings were largely in collaboration. Consult Siewerling, *Zur Erinnerung an Friedrich Jolly* (Berlin, 1904).

JOLLY, Julius (1849–). A German

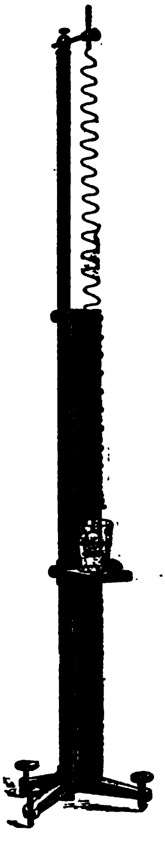
philologist and Sanskrit scholar, an authority on Hindu jurisprudence, son of Philipp von Jolly. Born at Heidelberg and educated at Munich, Berlin, and Leipzig, he, in 1872, became docent and, five years later, professor of Sanskrit and comparative philology at the University of Würzburg. He traveled two years (1882–83) in India. The most important of his works are: *Ein Kapitel vergleichender Syntax* (1872); *Geschichte des Infinitivs im Indogermanischen* (1873); *Naradiya Dharmasastra* (1876); *The Institutes of Vishnu* (1880; vol. vii of *Sacred Books of the East*); *Tagore Law Lectures* (1885); *A History of the Hindu Law of Partition, Inheritance, and Adoption* (1885); *Manutikāsangraha* (1885–90); *Institutes of Nāradasmriti* (1885–86); *Mānava Dharmaśāstra* (1887); *Minor Law Books* (1889; vol. xxxiii of *Sacred Books of the East*). To the *Grundriss der Indoarischen Philologie* he contributed the sections *Recht und Sitte* (1896) and *Indische Medizin* (1901). His biography of *Georg Bühler* appeared in 1899.

JOLLY, Philipp von (1809–84). A German physicist. He was born at Mannheim and studied at the universities of Heidelberg, Vienna, and Berlin. He became connected with the University of Heidelberg in 1834, as privatdocent, and in 1839 was appointed professor, serving until 1854, when he was called to the University of Munich. He was the inventor of many pieces of useful physical apparatus, which, originally designed for his researches, soon found a more general application. Among these are the air thermometer, the Jolly or spring balance for specific-gravity determinations, the copper eudiometer, and the mercury air pump. He also studied various osmotic phenomena, the expansion of gases, and the mass and density of the earth. He was the author of *Anleitung zur Differential- und Integralrechnung* (1846), *Die Principien der Mechanik* (1852), and *Die Physik der Molekularkräfte* (1857). A biography by Böhm was published at Munich in 1886.

JOL′LY BAL′ANCE. A piece of physical apparatus used in determining the specific gravity of small objects, especially minerals. It consists of a vertical standard from the upper end of which is suspended a spiral spring of fine wire. To the lower end of this spring are attached small pans, in each of which consecutively is placed the object whose specific gravity is to be determined. A scale—usually a mirror on which equal divisions are etched—is placed behind the spring, and the position of some fixed point, such as a bead, is noted on the scale. The object is then placed in the upper pan, and the spring being extended, the fixed point will be opposite some lower division on the scale. The amount that the spring is extended is noted, and after removing the object, weights enough to produce an equal extension are put in its place. The object is then placed in the lower pan, which is immersed in a vessel of water, and as the buoyant effort of the latter acts on the object the amount the spring is extended is diminished and the fixed point will be opposite some higher division on the scale, which, of course, is noted. Weights are then added to stretch the spring the same amount. The difference between the weights required to stretch the spring from its zero point to where it rests when the body is weighed in the air, and the amount required to bring it to the position it assumes when the pan and body are in the water, divided into the total weight, gives the specific gravity.

The usual arrangement of the apparatus is to have two pans, the lower of which is kept submerged in the water so that the conditions remain constant whether the body is placed in the upper or lower pan. The etched mirror usually employed forms an admirable scale, inasmuch as it enables the observer to avoid parallax and determine accurately the position of the fixed point, as when the bead or other point on the spring is seen with the eye, reflected together in the mirror, it implies that the eye, the fixed point, and the scale division are all in a straight line perpendicular to the surface of the mirror. In an accurate determination correction should be made for the temperature of the water, as explained under Specific Gravity, and the wire which carries the lower pan should be as fine as possible to eliminate the effects of capillarity between the water and the wire.

The Jolly balance is used mostly for rapid determination of specific gravity of such objects as mineralogical specimens and does not admit of as great precision as an analytical balance arranged for specific-gravity determinations. The spring must be suited to the weights of the objects which are to be used, so that the extensions will not be produced over too long or too short a range of scale. In the latter case a small error of observation will seriously affect the result. See Specific Gravity.



JOLLY BALANCE.

JOL′LY-BOAT′ (*jolly*, from Dan. *jolle*, Swed. *julle*, Dutch *jol*, Eng. *yawl* + *boat*). A small boat similar to a working dingy (see Boat), but generally smaller and broader. It is of cutter model, with a square stern, and usually clinker-built. The term is now little used, but a boat of this character is nearly always carried by merchant vessels.

JOLO. See Sulu.

JOLOF. See Yolof.

JOLY, zhō′lē′, Henri (1839–). A French philosopher. He was born at Auxerre, studied at the Ecole Normale Supérieure, and taught at Douai until 1871, and then at Dijon, where he was made dean in 1878. He was assistant at the Sorbonne (1881–83) and taught for a year (1886–87) at the Collège de France. After the suppression of his chair there he returned to Dijon. In 1903 he was elected a member of the Academy of Moral and Political Sciences. His works include: *Eléments de morale* (1880); *Psychologie comparée: L'homme et l'animal* (1877; 5th ed., 1911); *Psychologie des grands hommes* (1883; 3d ed., 1912); *Le crime* (1888); *La France criminelle* (1889); *Cours de philosophie* (9th ed., 1891); *Socialisme chrétien* (1892); *A travers l'Europe* (1898); *Malebranche* (1901); *Sainte Theresa* (1901; Eng.

trans., 1906); *De la corruption de nos institutions* (1903); *La Belgique criminelle* (1907); *La Hollande sociale* (1908); *La Suisse politique et sociale* (1909); *Problèmes de science criminelle* (1910); *L'Italie contemporaine* (1911); *L'Enfant* (1912); *Histoire de la civilisation* (1913).

JOLY, Jacques Crétineau-. See Crétineau-Joly, Jacques.

JOLY, jŏ'lĭ, John (1857–). An Irish physicist. He was educated at Trinity College, Dublin, was demonstrator of civil engineering there in 1882–91 and of experimental physics in 1893–97, and in 1897 became professor of geology and mineralogy. Joly devised a diffusion photometer known by his name; made valuable experiments in the early nineties on color photography, perfecting a system of trichromatic ruled screens and a method which was used (1897) for lantern slides; and determined with great accuracy the melting points of many minerals, inventing a meldometer for this purpose. He estimated the age of the earth from the quantity of sodium in the ocean. Besides many contributions to the *Proceedings*, etc., of the Royal Society and the Royal Dublin Society, he wrote an important book on *Radioactivity and Geology* (1909).

JOLY DE LOTBINIÈRE, zhō'lē' de lōt'bē'-nyâr', Sir Henri Gustave (1829–1908). A Canadian statesman. He was born at Epernay, France, was educated in Paris, studied law, and was called to the Lower Canada bar in 1855. He practiced his profession in the city and district of Quebec. Entering politics, he was elected a Liberal member of the Canada Legislative Assembly and was prominent in the debates preceding confederation, which he opposed, maintaining that French-Canadian rights would not be adequately protected. After confederation he became a member of the House of Commons and also of the Quebec Provincial Assembly, retaining his seat in both Houses until the abolition of dual representation in 1874. He elected to remain in the Quebec Assembly, where he became leader of the Liberal Opposition. In 1878 he became Premier of Quebec and pursued a vigorous policy of retrenchment, also striving to abolish the Provincial Legislative Council. He resigned in 1879, was again Opposition leader in 1879–83, and in 1885 retired from public life. After 10 years of comparative political inactivity he reëntered politics in 1895 and actively promoted the return of the Liberals to power under Sir Wilfrid Laurier in 1896. In 1897–1900 he was Minister of Inland Revenue in the Laurier administration and in 1900–06 Lieutenant Governor of British Columbia. He was made K.C.M.G. in 1895.

JOMARD, zhō'mär', Edme François (1777–1862). A French Egyptologist, born at Versailles. He studied at the École Polytechnique and accompanied the French army to Egypt in 1798 as a member of the scientific commission. Returning in 1802, he was appointed secretary to the commission, and in this capacity he edited the great *Description de l'Egypte*, contributing many essays, which were later published separately, and directing the printing for 20 years. In 1821 he took part in founding the Geographical Society of Paris, and in 1828 he became *conservateur administrateur* in the Royal Library. He suggested to Mehemet Ali to send a number of young Egyptians to be educated in Paris under his direction, thus forming the so-called Institut des Egyptiens. The next Viceroy conferred upon him the title of Bey. He wrote, among other works, *Voyage à l'Oasis de Syouah* (1823) and *Remarques sur les rapports de l'Ethiopie et l'Egypte* (1822).

JOMINI, zhō'mē'nē', Antoine Henri, Baron (1779–1869). A French general and writer on military topics. He was born at Payerne in the Canton of Vaud, Switzerland, and began his military career in a Swiss regiment in the French service, becoming Secretary of the Department of War under Masséna in 1799. He left the army in 1801, in 1805 began the publication of his *Traité des grandes opérations militaires*, and in the same year entered the French army, as aid-de-camp on the staff of Marshal Ney. He was present at Ulm (1805) and at Jena (1806), participated in the Prussian campaign of 1807, and was sent to Spain in the following year as chief of staff to Marshal Ney. He served in the Russian campaign of 1812 under Berthier and did good service during the retreat. In 1813 he helped win the battle of Bautzen; but, offended at the treatment which he received from Napoleon, he passed over to the allies and entered the service of Alexander of Russia, to whom he had offered his services some years before while in Switzerland. He refused, however, to fight against France or to divulge the military plans of Napoleon, which were well known to him. Napoleon said of him in St. Helena, "Jomini has not betrayed his colors, he had to complain of great injustice, he was blinded by an honorable sentiment, he was not French, the love of his country did not hold him back." In 1828 he took an active part in the military operations at Varna and in 1829 settled at Brussels. In 1853 he acted as military adviser to the Czar in the Crimean War and returned to Paris after the conclusion of peace in 1856. In 1859 his advice was sought by Napoleon III on the Italian campaign. Jomini was a magnificent tactician and strategist on the field as well as in council. Besides the work already mentioned, his *Histoire critique et militaire des campagnes de la Révolution* (Paris, 1820–24), his *Vie politique et militaire de Napoléon* (ib., 1827), his *Tableau analytique des principales combinaisons de la guerre* (St. Petersburg, 1830), and especially his *Précis de l'art de la guerre* (1836), are of great value to the military student. Consult Lecomte, *Le général Jomini* (3d ed., Lausanne, 1888).

JOMMELLI, yō-mĕl'lē, Nicolò (1714–74). A famous Neapolitan composer and one of the most celebrated masters of his time. He was born at Aversa, near Naples, and was educated under Canon Mozzillo, Durante, Feo, Leo, Prato, and Mancini. Previous to his appointment as kapellmeister to the Duke of Württemberg in 1754, his music had been marked by every characteristic of his national school and as such was very popular with his countrymen; but the influence of German ideals during his stay in that country, from 1753 to 1769, had so thoroughly entered into his work that, notwithstanding its increased richness and power in orchestration, it was no longer acceptable to his own Naples, and this neglect is said to have hastened his death. His first serious opera was *Odoardo* (1738), and although *Merope* (1747) was the most popular, his best were *Armida* (1770) and *Ifigenia in Aulide* (1773). Of his sacred compositions, the oratorio *La passione* (1748) is the most important. In 1749 he was chapel-master of St. Peter's, and the period of his activity there marks the zenith of his power as a Church composer, although by many his *Miserere* is considered his masterwork. His known compositions are 50 operas, five cantatas, four oratorios, and 34 Church compositions. His death occurred at Naples. Consult H. Abert, *Niccolo Jommelli als Opernkomponist* (Halle, 1908).

JO'NAH (Heb. *Yōnāh*, dove). A Hebrew prophet. According to 2 Kings xiv. 25, he was the son of Amittai, a native of Gath-hepher in Zebulon, and prophesied during the reign of Jeroboam II, King of Israel (782–740 B.C.). The subject of his prophecy was the deliverance of Israel from the oppression of the Aramæans of Damascus. (See JEHOAHAZ; JEROBOAM II.) These prophecies must have been delivered early in Jeroboam's reign. They have not been preserved. The fifth book of the Minor Prophets is ascribed to Jonah, but there are serious objections to assigning a preëxilic date to this production. (See JONAH, BOOK OF.) Isaiah xv-xvi. 12 has been attributed to Jonah, but the view is improbable and cannot be proved.

JONAH, BOOK OF. The fifth book of the Minor Prophets. In the superscription the authorship of the book is ascribed to Jonah, the son of Amittai. Considerations of language and style, however, the general thought and point of view, and the psalm in chapter ii, which closely resembles other psalms of late date, make it difficult to believe that the book was written as early as the time of Jeroboam II. It can hardly date before the time of Ezra and is more likely to belong to the Greek period. The psalm in chapter ii may be much later than the rest of the work. The book consists of two sections: (1) the episode of Jonah and the fish (chaps. i, ii); (2) the account of the repentance of Nineveh, Jonah's chagrin at finding his prophecies unfulfilled, and the divine rebuke in consequence (chaps. iii, iv). Chapter i begins with God's command to Jonah to go to Nineveh and proclaim its destruction. Jonah attempts to evade the duty and takes passage on a ship going to Tarshish. A great storm arises on the voyage, interpreted by the sailors as a sign of divine displeasure. Jonah is chosen by lot as the guilty one, confesses, and is cast into the sea and swallowed by a great fish. After three days he is cast forth alive on the shore. Chapter ii is a psalm of thanksgiving for deliverance from the perils of the sea. In chapter iii Jonah obeys the divine command and preaches at Nineveh. In consequence the people of the city, at the command of the King, repent and observe a fast in sign of contrition. God then changes His purpose, and Jonah in consequence is greatly displeased. God rebukes him in an emblematic way by means of a gourd which He causes to grow and furnish shade to Jonah against the heat of the sun for one day. When the gourd perishes, Jonah is in despair because of the discomfort he feels. Thereupon the lesson is made clear that, if he experiences such deep regret for a mere gourd, which, moreover, he had no share in producing, God may have pity on a city like Nineveh, containing such a vast population, many of them innocent and all God's creatures.

Many modern scholars think that the Book of Jonah is to be classed with the homiletic literature of the Jews, along with such books as Tobit and Susannah, which contain a narrative told for religious edification and in illustration of religious doctrines. From this point of view the book emanates from those Jewish circles which did not altogether sympathize with the exclusive conceptions developed by the doctrine of Israel's election, which, besides bringing about a total separation of the Hebrews from the "nations," placed the latter in the light of wicked people, merely because they were not Israelites. The Book of Jonah protests against this view and teaches, by means of a story of a prophet sent against Assyria, that even such a wicked heathen nation as Assyria, the old archenemy of Israel and Judah, could obtain the favor of God. The prophet himself is held up in the light of one who was more concerned with maintaining his prestige than to have his lessons followed. He urges upon God the destruction of Nineveh, despite the repentance shown by the latter. It is also the aim of the author, incidental to his main purpose, to hold the prophets up to ridicule by representing Jonah, the servant of God, as the one really disobedient to divine command. He is the one held responsible for the terrific storm which expresses the divine displeasure, as he is the one who needs the lesson of chapter iv. That the book maintained its place among the prophetic writings publicly read in the synagogue and formed a part of the final canon of Scripture is explained partly by its ascription to a preëxilic prophet mentioned elsewhere and partly by the symbolical interpretation to which it easily lent itself. Jonah as the dove—the favorite bird of sacrifice—symbolized Israel (cf. Ps. lxviii. 13). Nineveh was a disguise for Jerusalem, and the lesson of the city's repentance was intended for the Jews. In this way an interpretation of the book grew up which obscured its real and original purport.

Concerning the historicity of the book opinions have varied widely. But whatever opinion may be held on this point, there can be little doubt that its main purpose and aim was didactic. There is an old story of a man swallowed by a fish which appears in numerous forms among ancient nations—as, e.g., Bel and the dragon, Marduk and Tiamat. A story of a remarkable sea monster also appears to have some connection with the port of Joppa. The most complete discussion of these mythological motives will be found in the recent work of Hans Schmidt. Those who deny the historical character of the book, and regard the story of the prophet and the fish as a work of fiction as much as the parables of Jesus, emphasize, as a rule, more strongly than those who accept it as literal fact, the broad sympathy, the catholicity of sentiment, and the high conception of the divinity which this book reveals.

Consult: the general commentaries on the Minor Prophets (q.v.); Simpson, *The Jonah Legend* (London, 1899); Cheyne, "Jonah: A Study in Jewish Folk-Lore and Religion," in the *Theological Review* (1877); Kalisch, *Bible Studies*, vol. ii (London, 1877–78); Wright, *Biblical Essays* (ib., 1886); Hans Schmidt, *Jona* (Göttingen, 1910).

JONAH CRAB. The name in southern Massachusetts of a crab (*Cancer borealis*) differing from the common rock crab (q.v.) in being heavier, more massive, and in living at low water on exposed and rocky shores, being by its stronger, more solid shell better calculated to withstand the action of the waves; it also occurs as far down as 10 fathoms. It is supplied to the Newport markets in small quantities during the summer season, being considered by many as preferable to the blue or lady crab (q.v.).

JONAH MARINUS. See Ibn Janach.

JONAS, hō-näs′, Alberto (1868–). A Spanish pianoforte virtuoso, born in Madrid. He studied first at the conservatory at Madrid and from 1886 to 1890 at the Brussels Conservatory. During the winter of 1890–91 he completed his piano studies under Rubinstein at St. Petersburg (Petrograd) and in 1891 made his début in Berlin. From 1894 to 1905 he was professor of music at the University of Michigan. In 1906 he settled in Berlin, where he gained great success as a teacher.

JONAS, yō′nȧs, Justus (1493–1555). A German theologian and reformer (originally Jobst Koch), born at Nordhausen, Saxony. He studied at Erfurt, became professor of law, and in 1521 professor of theology at Wittenberg, where he had studied for a time in 1511. He was ordained priest about 1515 and became pastor at Halle in 1541–46, court preacher at Coburg in 1551, pastor at Ratisbon in 1552, and in the following year became superintendent at Eisfeld. He was an intimate friend of Luther, whom he accompanied to the diets of Worms and Augsburg and assisted in his translation of the Old Testament. He also preached his funeral sermon. By his preaching and his translation into German of the Latin writings of Melanchthon and Luther, beginning with the theses of the latter, he did much to promote the Reformation. Consult Pressel, *Justus Jonas* (Elberfeld, 1862), and Lindsay, *History of the Reformation in Germany* (New York, 1906).

JON′ATHAN (Heb. *Yĕhōnāthān*, Yahwe gives). Eldest son of King Saul and friend of David. He was a valiant warrior, smote a garrison of the Philistines at Geba (1 Sam. xiii. 3), and a little later, assisted by his armor-bearer alone, attacked a Philistine garrison and threw the enemy into confusion (xiv. 1–18). Saul thereupon brought up his forces and completed the rout (vs. 19–23). In connection with this victory it is related that Jonathan, ignorant of a prohibition issued by his father not to partake of food until evening, ate some wild honey and as a consequence, but for the interference of the people, who ransomed their hero, would have been killed (vs. 24–46). The fast, for such it appears to have been, was probably ordained by Saul as a means of securing the assistance and favor of Yahwe in the fight. Noteworthy as Jonathan's achievements in war were, his fame rests upon the friendship between him and David. This, one of the most romantic and attractive narratives of the Old Testament, as related in 1 Sam. xviii–xx, is believed by scholars to be based on facts. Jonathan, together with his father and two of his brothers, fell at Mount Gilboa in a battle against the Philistines (1 Sam. xxxi. 2–6), and David gave a touching expression to his love for Jonathan in his beautiful elegy over Saul and Jonathan (2 Sam. i. 18–27). Consult Schmidt, *Messages of the Poets* (New York, 1911).

JON′ATHAN. The Hasmonæan, brother of Judas Maccabæus (q.v.). On the death of Judas in battle against the Syrians (161 b.c.) the leadership of the struggle of the Jews for national independence devolved upon Jonathan. The odds against him seemed at first overwhelming. The discontented elements of the population, abetted by the Syrians and the renegade high priest Alcimus, a puppet of the Syrians, attempted to crush out the patriotic party. For some time Jonathan maintained himself in the regions east of the Jordan. At length, after the death of Alcimus (May, 160 b.c.), Bacchides, the Syrian governor, having fortified and garrisoned a number of towns in Judæa, returned to Syria. This was Jonathan's opportunity. In a quiet way he managed to increase his influence and more thoroughly organize his party, with the result that after two years the pro-Syrian party became alarmed and sent to Antioch for assistance. Bacchides returned, but found Jonathan so strong that he was compelled to recognize him, and determined to make peace with him. Jonathan took up his residence at Michmash, a few miles north of Jerusalem, and for five years so guided the affairs of the patriots that, notwithstanding the existence of the council at Jerusalem and the Syrian garrisons in the country, he succeeded in uniting the mass of the population under his leadership. The wars of contestants for the throne of Syria proved advantageous to the patriots. Demetrius I was opposed by the pretender to the throne, Alexander Balas. Each of the rivals courted Jonathan's assistance, making him liberal offers both for himself and his country. Jonathan, seeing that Alexander was destined to win, accepted the insignia of princely rank sent him and espoused his cause. In the same year (153 b.c.) he assumed the duties of high priest, which office had been vacant since the death of Alcimus. Alexander, aided by Ptolemy of Egypt, was victorious, and at the celebration of his marriage to Cleopatra, Ptolemy's daughter, Jonathan was an honored guest and was publicly confirmed in his rank and privileges. He was recognized as the military, civil, and religious head of Judæa, subject to the overlordship of Syria. This remarkable success was due to Jonathan's political shrewdness as much as to his military abilities. It was not long, however, before Syrian politics were again disturbed by the appearance of Demetrius II as a rival of Alexander Balas. Demetrius was assisted by Ptolemy and won the day, but Jonathan was strong enough not only to repel an attempted invasion of Judæa, but to gain important military successes in the old Philistine territory. He even advanced a step farther and laid siege to the citadel of Jerusalem, occupied by the Syrian garrison, the symbol of Syrian sovereignty. Jonathan's aim was now evidently complete independence of Syria. Demetrius heard of this and summoned Jonathan before him. Jonathan obeyed the summons without raising the siege. The result of his interview with Demetrius was that, while a considerable tract of territory was added to Judæa's domain, the taxes were materially reduced, and Jonathan was confirmed in his various offices, still the Syrian claim of overlordship was maintained, and the garrison remained in Jerusalem. Soon after this Demetrius, who was unpopular, was forced to meet a rebellion headed by a certain Trypho, who claimed to be espousing the cause of Antiochus, son of Alexander Balas. Though Jonathan assisted Demetrius in suppressing the revolt in Antioch, the King failed to show any gratitude, and in the civil war that followed the Jews favored Trypho. Jonathan now engaged in many active and successful campaigns against the forces of Demetrius, conquered much adjacent territory to the east and south, fortified Joppa, and finally renewed his efforts to reduce the Syrian garrison in the strong fortress of Jerusalem. He was now a powerful prince with a well-disciplined army of over 40,000 men, and Trypho saw that he must be crushed if his own ambitious designs were to succeed. He entrapped Jonathan by artful means and at first held him for a ransom, but after the ransom was paid foully murdered him (143 B.C.). Jonathan was eminently the politician of the three brothers whose careers were so glorious. His administration of 18 years was a conspicuous success. It was comparatively easy for his brother Simon, who succeeded him, to reap the benefits of Jonathan's policy and secure, in the following year (142 B.C.), complete independence for the Jews. Consult 1 Maccabees, chaps. ix–xiii, and Emil Schürer, *History of the Jewish People in the Time of Christ*, vol. i (New York, 1896).

JONATHAN BEN UZZIEL, ŭz-zī'ĕl *or* ŭz'zĭ-ĕl. A Jewish scholar, disciple of Hillel (q.v.), who lived about the time of Jesus. He is the traditional author of the Targum, or Aramaic translation of the prophets, but proof of his authorship is entirely lacking; the Targum Pseudo-Jonathan also formerly passed as his work. No details of Jonathan's life are known. See Targum.

JONATHAN OLDSTYLE. See Oldstyle, Jonathan.

JONATHAN WILD, The History of. A novel by Fielding (1743).

JONCKBLOET, yŏŋk'blo͝ot, Willem Jozef Andries (1817–85). A Dutch critic and historian of literature, born at The Hague. In the University of Leyden he studied medicine, then jurisprudence, and finally literature. He was professor at the Athenæum of Deventer (1847) and at the University of Groningen (1854). In 1864 he was elected to the Lower House of the States-General, but in 1877 returned to literary work, as professor of the literature of the Netherlands, at Leyden. He gave up his professorship in 1883. He edited many mediæval works, both Dutch and French, but his more important publications are: *Geschiedenis der middennederlandsche dichtkunst* (1851–54); *Etude sur le roman de Renart* (1863); *Geschiedenis der Nederlandsche letterkunde* (last ed., 1890).

JONCTIJS, or **JONCTYS**, yŏŋk'tĭs, Daniel (1600–?). A Dutch poet, born at Dort. He studied medicine, and began to practice at Dort, but the theological party caused him to leave the city on account of a satirical poem, *De Hedendaagsche Venus en Minerva* (1643), directed against them. He afterward became a judge at Rotterdam. His *Rozelyns Oogjes ontleed* (1620–23), a series of love poems, was at one time much admired.

JONES, Alexander (c.1802–63). An American inventor, journalist, and author, born in North Carolina, of Welsh descent. After studying medicine in Philadelphia he went to practice it in Mississippi, but while there undertook to invent an improved cotton gin, which ultimately replaced the old, and made himself so famous that he received an offer to superintend the introduction of his improvements into Hindustan cotton fields. This he declined, but his ingenuity found further outlet in a street sweeper, which he invented while engaged in journalistic work in New York, and in the formulation of a code of ciphers, the first employed by the Associated Press, of which he was agent (1850). For several years he was the writer on commercial topics for the New York *Herald*, contributed to other American and English papers, and wrote: *Cuba in 1851* (1851); *Historical Sketch of the Electric Telegraph* (1852); *The Cymri of Seventy-Six* (1855).

JONES, Alfred (1819–1900). An American engraver, born in Liverpool, England. He was apprenticed in 1834 to an engraving firm in Albany, N. Y., and later studied at the National Academy of Design, where he received first prize in 1839. He was made a member of the National Academy in 1851. In 1846–47 he worked in England under some of the best London masters of the art of engraving. After 1851 he confined himself chiefly to bank-note engraving. His large plate, "The Image Breaker" (1850), is considered one of the best line engravings produced in the United States. Other fine examples of his work are: "Mexican News" (1851); "The New Scholar" (1850); "The Capture of Major André." His portraits of George Washington, A. B. Durand, and Thomas Carlyle combine line work with etching admirably.

JONES, Alfred Gilpin (1824–1906). A Canadian statesman, born in Weymouth, Nova Scotia, and educated at the Yarmouth Academy. His active interest in politics did not begin until 1865, when the movement for Canadian confederation brought him out as one of its opponents, and, after the death of the Hon. Joseph Howe, he became the leader of the Nova Scotia opposition to that plan. In 1867 he was elected a member of the Dominion Parliament for Halifax and, joining the Liberal party in federal politics, was made Minister of Militia in the cabinet of Alexander Mackenzie, an office which he held in 1874–78. He served an additional term as member of the Dominion Parliament during 1887–91. In 1900–06 he was Lieutenant Governor of Nova Scotia. Jones, though a United Empire Loyalist by descent and during his earlier career a Conservative, later became a warm supporter of commercial union with the United States and in general was opposed to schemes of Imperial consolidation, whether in trade or politics.

JONES, Anson (1798–1858). A President of the Republic of Texas, born at Great Barrington, Mass. He studied medicine and, after living for short periods in Philadelphia, New Orleans, and South America, finally, in 1833, settled in Brazoria Co., Tex. He was a surgeon in the Texan army during the war between that country and Mexico and after the cessation of active hostilities was elected a member of the Second Texan Congress (1834). The next year he was appointed Minister to the United States. After his return from Washington he was elected from Brazoria County to the Texan Senate, and in 1841 President Houston appointed him Secretary of State. In 1844 he was elected President of Texas, an office which he held until Feb. 19, 1846, when he turned over the government to J. Pinckney Henderson, the first Governor under the Constitution of the United States. His journal and autobiography were published in 1858. Jones County, and its county seat, Anson, in Texas, were named in his honor.

JONES, Charles Colcock (1831–93). An American lawyer, born at Savannah, Ga. He graduated at Princeton in 1852 and at the Harvard Law School in 1855, was admitted to the bar in Savannah in the same year, and soon took high rank in his profession. He was elected mayor of the city in 1860. On the passage of the ordinance of secession in 1861, he entered the Confederate army and served as lieutenant colonel of artillery under Gen. J. E. Johnston until the close of the war. He then removed to New York, where he practiced law until his return to Georgia in 1877. His publications include: *Historical Sketch of the Chatham Artillery during the Confederate Struggle for Independence* (1867); *Reminiscences of the Last Days of Gen. Harry Lee* (1870); *Antiquities of the Southern Indians* (1873); *Life of Commodore Josiah Tatnall* (1878); *History of Georgia* (2 vols., 1883); *English Colonization of Georgia* (1887).

JONES, David Phillips (1841–1903). An American naval engineer, born in Philadelphia, Pa. After serving as resident engineer in the office of the Surveyor-General of Utah Territory, he entered the navy in 1862 as third assistant engineer and in 1862–63, on board the *Cimerone* and later the *Sangamon*, participated in the operations on the James River, Va., and the St. John's River, Fla. In 1864 he was promoted to be second assistant engineer, and on board the *Mendota*, of the James River division of the North Atlantic squadron, was present at the battle of Bermuda Hundred. In 1867 he attained the rank of passed assistant engineer and in 1889 that of chief engineer. During a leave of absence he was constructing engineer of the St. Louis and Southeastern Railway, in 1874–79 was instructor in steam engineering at the United States Naval Academy, in which capacity he organized the department of mechanical drawing for cadet engineers, and from 1885 to 1888 was on duty as professor of mechanical engineering at the Kansas Normal College. From 1889 until his retirement in 1892 he was at the United States navy training station at Newport, R. I. During the Spanish-American War (1898) he was ordered to Pittsburgh, Pa., as chief inspector of steel for that district, and at the close of the war became a consulting engineer at Pittsburgh.

JONES, Ebenezer (1820–60). An English poet. Born in London, of poor parents, he escaped from their rigid Calvinism under the leadership of Robert Owen, Shelley, and Carlyle, and turned to verse making as a relief from office toil. At the age of 23 he published his first volume of poems, *Studies of Sensation and Event*, which met even a worse reception than it deserved. The poet was soured in consequence and took up radical journalism. He returned to the muse only when chastened by domestic unhappiness and sick unto death, and gave evidence by his "Winter Hymn to the Snow," "When the World is Burning," and "To Death," of what he might have done had longer life been granted him. Consult the 1879 edition of *Studies of Sensation and Event*, with a memoir by his brother, Sumner, and corrections and new poems by the poet himself.

JONES, Edward ("Bardy Brenin") (1752–1824). A Welsh harpist and author, born at Llanderfel in Merionethshire. He was an important factor in the encouragement and development of Welsh minstrelsy and devoted his entire life to the study of the harp. He first appeared in London in 1775 and eight years later received the royal appointment of bard to the Prince of Wales. His works include: *Musical and Poetic Relics of the Welsh Bards* (1784 and 1794); *The Bardic Museum of Primitive British Literature*, which contains over 200 Gaelic melodies (1802); *Lyric Airs, Consisting of Specimens of Melodies of Greek, Albanian, Wallachian, Turkish, Persian, Chinese, and Moorish Melodies* (1804); *Cheshire Melodies* (1803); *The Musical Bouquet* (1799). Other publications for which no definite dates can be assigned are: *The Musical Miscellany; Terpsichore's Banquet; The Minstrel's Serenade; Maltese Melodies; The Musical Portfolio; Musical Remains of Handel, Bach, Abel, etc.; A Collection of Melodies for Beginners on the Harp.* He died in London.

JONES, E(mily) E(lizabeth) Constance (c.1857–). An English educator and writer on logic and ethics. She was educated at Girton College, Cambridge, taking a first class in the Moral Sciences Tripos in 1880; was resident lecturer on moral sciences (1884–1903) at Girton, vice mistress (1896–1903), and after 1903 mistress. She translated, with Miss Hamilton, Lotze's *Mikrokosmus* (1888); edited Sidgwick's *Methods of Ethics* (1901) and his *Ethics of Green, Spencer, and Martineau* (1902); and wrote *Elements of Logic* (1890); *A Primer of Logic* (1905); *A Primer of Ethics* (1909); *A New Law of Thought and its Logical Bearing* (1911); *Girton College* (1913).

JONES, Ernest Charles (1819–68). An English orator, poet, and politician. He was born in Berlin and studied at Luneburg and Göttingen. He was called to the bar in 1844 and two years afterward became deeply interested in the Chartist programme. He edited the *Laborer* and the *Northern Star*, defended O'Connor, and soon after broke with him, as his own plans became more radical and revolutionary. Jones urged a provisional government and was elected as one of its members by the Chartists. His speeches in May, 1848, counseled forcible attack on the established order, and he was imprisoned for two years. He adhered to Chartism after all others had forsaken it. Jones was a persuasive and brilliant orator. His prose had little worth, but his verse was marked by a true lyric gift. His varied literary activity included the writing of sensational novels and stories, published in the fifties and now forgotten; *The Battle Day and Other Poems* (1855), highly praised by Landor; *Evenings with the People* (1856), a series of political addresses.

JONES, Francis Coates (1851–). An American figure painter. He was born in Baltimore and studied at the Ecole des Beaux-Arts, Paris, under Boulanger and Lefebvre. A resident of New York after 1882, in 1894 he was elected to the National Academy of Design. He is fond of painting children or young girls in charming surroundings and shows cleverness in the handling of detail. His drawing is accurate, his color delicate, but his works are too detailed in finish and lack inspiration. Among his paintings are: "A Perplexing Move" (1909); "A Cup of Tea" (1910); "Nymphs Bathing" and "The Letter" (1911); "The Sisters" and "Wooded Hillside" (1912); "The Trout Pool" (1913). He was awarded the Clarke prize by the Academy in 1885, and the Shaw purchase by the Society of American Artists in 1904.

JONES, Frederick Scheetz (1862–). An American physicist and university dean. He was born at Palmyra, Mo., and was educated at Yale University (A.B., 1884; A.M., 1891), Berlin (1887–88), and the Polytechnic School at Zurich, Switzerland (1888–89). He was professor of physics from 1889 to 1909, and dean of the College of Engineering from 1902 to 1909, at the University of Minnesota, and thereafter he served as dean of Yale College. His investigations in physics deal with primary cells and Röntgen rays.

JONES, George Heber (1867–). An American Methodist Episcopal missionary, born at Mohawk, N. Y. In 1887 he went as a missionary to Korea, where he was in educational work at Seoul (1888–93), was presiding elder of the Chemulpo District (1895–1903), and served as superintendent of the Korea Mission of his denomination (1897–99). He returned to the United States in 1903 to be field secretary of the Methodist Board of Missions, but four years later again went to the East as president of the Biblical Institute of Korea. He lectured on missions at Boston University in 1910, was executive secretary of the Korean Quarter Centennial Movement of the Methodist Episcopal church in 1910–12, and in 1913 became editorial secretary of the Methodist Board of Foreign Missions. An authority on the history, language, literature, and religion of the Koreans, he wrote *Korea: The Land, People, and Customs* (1907) and *An English-Korean Dictionary of Scientific and Technical Terms* (1910).

JONES, Harry Clary (1865–). An American chemist, born at New London, Md. He graduated from Johns Hopkins University (A.B., 1889; Ph.D., 1892); studied for two years at Leipzig, Amsterdam, and Stockholm; and then, returning to Johns Hopkins as an instructor in physical chemistry, later became associate (1898), associate professor (1900), and professor (1904). He became associate editor of the *Journal de Chimie Physique*, of the *Zeitschrift für physikalische Chemie*, and of the *Journal* of Franklin Institute, whose Langstreth medal he was awarded in 1913. Besides translating Biltz's *Practical Method of Determining Molecular Weights* (1899), he wrote: *Freezing Point, Boiling Point, and Conductivity Methods* (1897); *Theory of Electrolytic Dissociation* (1900); *Elements of Physical Chemistry* (1902; in Russian, 1911; in Italian, 1912); *Elements of Inorganic Chemistry* (1903); *Electrical Nature of Matter and Radioactivity* (1906); *Hydrates in Aqueous Solutions* (1907); *The Absorption Spectra of Solutions* (1909); *Introduction to Physical Chemistry* (1910); *Electrical Conductivity of Salts and Organic Acids* (1912); *A New Era in Chemistry* (1913); and many contributions to European and American journals.

JONES, Henry (1721–70). An Irish poet and dramatist, born at Beaulieu, near Drogheda, County Louth. He was a bricklayer by trade, but he pushed his way into literary circles through his flattery of influential men, while his ability to write complimentary verses stood him in good stead with the landladies who accepted them in lieu of board money. Lord Chesterfield became his patron when Lord Lieutenant of Ireland and afterward in London helped him to publish his *Poems on Several Occasions* (1749) and to get his tragedy, *The Earl of Essex,* put on at Covent Garden (1753). Other plays and poems of his have fallen into oblivion. An inordinate devotion to drink brought him under the wheels of a coach in St. Martin's Lane and terminated an unedifying career.

JONES, Henry (1831–99). An English writer on whist, born in London. He will be more generally recognized by his pen name, Cavendish. Bred to the game on which he became an authority by his father, Dr. Henry D. Jones, he codified its laws and wrote a work in many ways invaluable to card players, *Principles of Whist, Stated and Explained by "Cavendish"* (1862). Somewhat the same service he rendered in books on piquet and écarté. Of other games, outdoor and indoor, he also wrote, and notably of billiards, tennis, and croquet. In 1852 he began the practice of medicine in London and continued active in this profession for some 15 years.

JONES, Sir Henry (1852–). A British philosopher, born at Llangernyw, North Wales. He was educated at the University of Glasgow, was made professor of philosophy and political economy at the University College of North Wales and professor of logic and metaphysics at St. Andrews, whence in 1894 he went to Glasgow as professor of moral philosophy. He was given the LL.D. by St. Andrews (1895) and the D.Litt. by the University of Wales (1905) and in 1912 was knighted. He wrote: *Browning as a Religious and Philosophical Teacher* (1891; 6th ed., 1912); *The Philosophy of Lotze* (1895), a valuable piece of criticism; *The Immortality of the Soul in the Poems of Tennyson and Browning* (1905); *Idealism as a Practical Creed* (1909); *The Working Faith of the Social Reformer* (1910); *Social Powers* (1913).

JONES, Henry Arthur (1851–). An English playwright, born at Grandborough, Buckinghamshire, and educated at Winslow School. When only 13 years old, he left school and was thrown upon his own resources. He first became known in London as the author of *Clerical Error,* performed by Wilson Barrett at the Court Theatre (1879). This play was followed in 1882 by *The Silver King* at the Princess's Theatre, which ran for over a year. In 1884 Jones began a series of social dramas, mostly comedies. They met with extraordinary success, as played in English-speaking countries in both hemispheres, and some of them were translated and produced in continental cities. Among them are: *Saints and Sinners* (1884); *The Middleman* (1889); *Judah* (1890); *The Dancing Girl* (1891); *The Tempter* (1893), a tragedy; *Michael and his Lost Angel* (1896); *The Rogue's Comedy* (1896); *The Liars* (1897); *The Manœuvres of Jane* (1898); *Carnac Sahib* (1899); *Mrs. Dane's Defence* (1900); *The Princess's Nose* (1902); *Whitewashing Julia* (1903); *Joseph Entangled* (1904); *The Heroic Stubbs* (1906); *The Hypocrites* (1906); *We Can't be as Bad as All That* (1910); *Mary Goes First* (1913), in which Marie Tempest had notable success in London and New York; and *The Lie* (1914), in which Margaret Illington appeared. Jones visited the United States in 1914. He wrote also *The Renascence of the English Drama* (1896); *The Foundations of a National Drama* (1913); *The Theatre of Ideas,* three plays (1915).

JONES, Henry Bence (1814–73). An English physician and chemist, born at Thorington Hall, Suffolk. He was educated at Harrow and at Trinity College, Cambridge (B.A., 1836), and later studied chemistry at University College, London, and in Giessen under Liebig. Trinity College gave him the degrees of M.A. (1842) and M.D. (1849). From 1845 to 1862 he was connected with St. George's Hospital in London. Jones was an authority on diseases of the stomach and kidneys. He wrote: *Gravel,* *Calculus, and Gout* (1842); *Animal Electricity* (1852); *Lectures on the Application of Chemistry and Mechanics to Pathology and Therapeutics* (1867); *Croonian Lectures on Matter and Force* (1868); *Life and Letters of Faraday* (1870); as well as many scientific memoirs in chemical, medical, and physical journals.

JONES, Hugh Bolton (1848–). An American painter, born at Baltimore, Md. He studied in his native city and then went abroad, where he remained for several years, sketching in Spain and France. He was elected an academician in 1883. Typical examples of his work, which is correct in line and delicate in color, but overdetailed in finish and lacking in inspiration, are "Spring" and "Autumn," in the Metropolitan Museum, New York.

JONES, Inigo (1573–1652). An English architect, born in London. Of his early history little is known till the time when the Earl of Pembroke, attracted by his great aptitude for drawing, sent him abroad for four years to study the masterpieces of architecture in France, Germany, and Italy. He spent most of his time in Venice, paying particular attention to the works of Palladio, whose style he introduced into England, whence we sometimes hear Jones designated as the "English Palladio." After a visit to Denmark he returned to England before 1605, when he was employed by James I in arranging the scenery and properties for the masques of Ben Jonson, which were at that time the chief amusement of the court. Jonson afterward satirized his fellow laborer in *Bartholomew Fair*. In 1613 and 1614 Jones revisited Italy, still further to improve his style, and on his return to England was appointed surveyor-general of the royal buildings (1615). Jones was at this time accounted the first architect of England and according to some the first of the age. His great reputation is, however, due less to the intrinsic merit of his works, which was often mediocre, than to his introduction of what was for England a new and monumental style of design. In 1618 he planned the palace of Whitehall (950 × 1280 feet), of which only the famous banqueting hall, considered to be his masterpiece, was carried out. Other works of his are Chiswick Villa, in close imitation of Palladio's Villa Capra, the church of St. Paul in Covent Garden, Ashburnham House, and Surgeons' Hall. Most of his important works, such as the renovations of the façade of Old St. Paul's, Shaftesbury House, Physicians' College, etc., have been destroyed. His ***Designs***, consisting of plans for public and private buildings, was published by W. Kent at London, 1727. Consult: R. T. Blomfield, "Inigo Jones," in the *Portfolio* (London, 1889); W. J. Loftie, *Inigo Jones and Wren* (New York, 1893); Peter Cunningham, *Life of Inigo Jones* (London, 1898); Ernest Rhys, "The Masques of Inigo Jones," in *The Nineteenth Century and After*, vol. liv (ib., 1903); A. T. Bolton, *Jacobean Architecture and the Work of Inigo Jones in the Earlier Style* (ib., 1911).

JONES, Jacob (1768–1850). An American naval officer, born in Kent County, near Smyrna, Del. He studied medicine at the University of Pennsylvania, but soon after graduation gave up his practice to accept the position of clerk of the Supreme Court of Delaware. In 1799 he entered the United States navy as a midshipman and during the war against the Barbary corsairs was captured with the *Philadelphia* in 1803. He was liberated after a year and a half of captivity and in 1810 was promoted to the rank of commander. On Oct. 18, 1812, his vessel, the 18-gun sloop of war *Wasp*, captured the British 18-gun *Frolic;* but scarcely had he put a crew aboard his prize when the *Poictiers*, a British 74, appeared and captured them both. On his return to the United States Jones received a vote of thanks and a gold medal from Congress, which also voted $25,000 prize money to be distributed among the officers and crew of the *Wasp*. Jones was promoted to the rank of captain and was placed in command of the captured frigate *Macedonian*. After the return of peace he commanded squadrons in the Pacific and in the Mediterranean, where he vanquished the Algerian pirates. For several years he was a commissioner of the naval board, and governor of the naval asylum at Philadelphia.

JONES, James Kimbrough (1839–1908). An American lawyer and politician, born at Love, Marshall Co., Miss. Educated by private tutors, at 20 he entered an Arkansas mercantile firm, and during the Civil War, despite physical weakness, he served with credit in the Confederate army. Afterward he engaged in agriculture and, having just been admitted to the Arkansas bar, was elected State Senator in 1873. He was reëlected in 1875 and 1877 and during his last term was President of the Senate. A leader of the Democrats, Jones participated in the Brooks-Baxter war, which resulted in ousting the Republican party from control. He was elected to Congress in 1880, was twice reëlected, and from 1885 to 1903 was United States Senator. In the Senate Jones was an important figure, being chairman of the Democratic caucus and a member of the Finance Committee. He fought for the passage of the Wilson Tariff Bill, but opposed the Cleveland administration on the silver question. In 1896 he was chairman of the Democratic Convention at Chicago, and after Bryan's nomination he was manager of the campaign. Again in 1900 he was chairman of the Democratic Convention and also headed the National Committee. Defeated in his candidacy for a fourth term in the Senate, he retired to the practice of law in Washington.

JONES, Jenkin Lloyd (1843–). An American Unitarian clergyman and author, born at Llandyssil, Cardiganshire, Wales, but brought to Wisconsin when a year old. He served in the Civil War; graduated from Meadville (Pa.) Theological Seminary in 1870; for nine years had a charge at Janesville, Wis.; and in 1882 organized All Souls' Church, Chicago, of which he was thereafter pastor. He held various high offices in his church and was instrumental in organizing the Congress of Religion. *Unity*, the journal which became the organ of the congress, he edited after 1879. In 1909 he was given the degree of LL.D. by the University of Wisconsin. The founder and first president of the Chicago Browning Society, he lectured on literature at Chicago University and published: *The Faith that Makes Faithful* (1885), with W. C. Gannett (q.v.); *Practical Piety* (1890); *Word of the Spirit* (1897); *Jess: Bits of Wayside Gospel* (1897; and 2d series, 1901, as *A Search for an Infidel*); *Nuggets from a Welsh Mine* (1902); *Reinforcement of Faith* (1905); *Conscience Calls* (1906); *On the Firing Line in the Battle for Sobriety* (1910).

JONES, John (1729–91). An American surgeon, born at Jamaica, N. Y., of Welsh descent.

He studied medicine at Paris, Leyden, London, and Edinburgh; practiced in New York; was professor of surgery in King's College (now Columbia University) for nine years; and, with Dr. S. Bard, founded the New York Hospital (1771). When New York was occupied by the British, he went to Philadelphia, where he was elected one of the physicians of the Pennsylvania Hospital, and in 1787, on the institution of the College of Physicians of Philadelphia, he was elected vice president. He was Washington's family physician in Philadelphia and the intimate friend and physician of Franklin, whom he attended in his last illness. He published *Plain Remarks upon Wounds and Fractures* (1775), republished with a memoir, by Dr. Mease (1795). Jones was a skillful operator and especially well known for his success in lithotomy.

JONES, John Paul (1747–92). A famous naval officer in the American Revolution, born in Kirkcudbrightshire, Scotland, July 6, 1747. His name was originally John Paul, "Jones" being subsequently added for reasons unknown. In his twelfth year he was apprenticed to a merchant of Whitehaven, who was actively engaged in the American trade, and shortly thereafter sailed for Virginia, where his brother was settled as a planter. For a time he lived at Fredericksburg with his brother, devoting his leisure to the study of nautical affairs. In 1766, his indentures being canceled, he made a voyage to Jamaica as chief mate on a slaver. He soon abandoned this business, however, and in 1768 took passage in a brigantine for Scotland. The master and mate dying in the course of the voyage, Paul assumed command and carried the vessel safely into port. For this service the owners appointed him captain and supercargo and sent him on a voyage to the West Indies. He continued this trade and accumulated a fortune by commercial speculation. In 1773, his brother having died childless and intestate, he returned to Virginia to settle the affairs of the estate which had fallen to him, and for a time gave his attention to planting. It was then that he assumed the name of Jones, by which he was subsequently known. Upon the outbreak of the Revolution he offered his services on behalf of the Colonies and was early invited to aid the Naval Committee of Congress with information and advice. He also served on a commission for the purchase of vessels for the new navy, and on Dec. 22, 1775, was commissioned senior first lieutenant of the flagship *Alfred*. After a short cruise, during which a successful attack was made on New Providence and a squadron was captured, he was transferred to the *Providence* with the rank of captain. He then made a cruise in the West Indies and in 47 days captured 16 prizes and destroyed a number of small vessels together with the fishery at Isle Madame. He then resumed command of the *Alfred*, and in November, 1776, sailed from Newport to Nova Scotia, where he captured a number of British coal transports, liberated 100 Americans confined at hard labor in the mines, destroyed the Cape Breton fishery, and returned to Boston with several prizes. In June, 1777, Jones was transferred to the command of the *Ranger*, one of the newly built vessels of the navy, and the one upon which the stars and stripes are said to have been hoisted for the first time. On November 1 Jones sailed from Portsmouth, N. H., with instructions to hover about the coast of Great Britain and destroy the English shipping. Before entering the Channel he stopped in France to deliver to the American commissioners the official dispatches announcing the surrender of Burgoyne and to confer with them in regard to his mission in European waters. He then sailed to the north coast of England, seized the port of Whitehaven, spiked its guns, and burned some of the shipping. It was then that he conceived the project of capturing the Earl of Selkirk on his fine estate near Kirkcudbright and of holding him as a hostage. The project miscarried on account of the absence of the Earl, whose plate, however, was appropriated by the crew of the *Ranger* and was sold, but was subsequently purchased by Jones and restored to the rightful owner. In the summer of 1778 Jones captured near the English coast the *Drake*, a 20-gun warship of superior build, and carried it into Brest with 160 prisoners. His exploits won him great renown in America, and he was placed in command of the ship *Duras*, furnished by the French government, the name of which he changed to the *Bon Homme Richard*, and in August, 1779, he sailed with a squadron of five vessels, three American and two French, for the coast of Scotland, creating even greater alarm among the inhabitants than before. Off Flamborough he fell in with a fleet of 41 British merchantmen returning from the Baltic and convoyed by two powerful men-of-war, the *Serapis*, carrying 40 guns, and the *Countess of Scarborough*, with 20 guns. On the evening of Sept. 23, 1779, Jones engaged the *Serapis* in battle, and after three hours' desperate fighting, during the course of which the *Serapis* and the *Bon Homme Richard* were lashed together, the *Serapis* surrendered. The *Bon Homme Richard*, however, was so badly damaged that it sank two days later, the crew in the meantime being transferred to the *Serapis*.

For this victory Jones was, upon his arrival in Paris, presented by Louis XVI with a gold-mounted sword and was decorated with the cross of the Order of Military Merit. Upon his return to America in February, 1781, Congress voted him a gold medal, passed a resolution commending his "zeal, prudence, and intrepidity," assigned him to the command of a new ship of the line then building, and proposed to create for him the rank of rear admiral. The British, however, regarded Jones as a pirate and refused to recognize the validity of his captures. At the close of the war he went to Paris as American agent for prize money. In 1788 he entered the Russian service against the Turks, with the rank of rear admiral, but on account of the jealousies and intrigues of the Russian officers he resigned. In 1790 he retired to Paris, where he remained in retirement for the rest of his life. In 1792 he was appointed United States Consul at Algiers, but died before his commission arrived. A long search, instituted by Gen. Horace Porter, Ambassador to France, resulted in the discovery of his body in the old St. Louis Cemetery, in Paris, on April 14, 1905. The following July a United States squadron conveyed the body to Annapolis, Md., where it was buried, with the usual naval ceremonies.

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(Boston, 1901); A. C. Buell, *John Paul Jones* (2 vols., New York, 1906); J. S. Barnes (ed.), *Logs of the Serapis, Alliance, Ariel, under the Command of John Paul Jones, 1779–1780*, printed for the Naval History Society (ib., 1911); R. M. Crawford, *The Sailor whom England Feared* (London, 1913); Nathaniel Fanning, *Fanning's Narrative, the Memoirs of Nathaniel Fanning, an Officer of the American Navy, 1778–1783* (ib., 1913).

JONES, John Percival (1829–1912). An American legislator and politician, born in Herefordshire, England. When a year old, he was brought to the United States by his parents, who settled in northern Ohio. He received his education in the public schools of Cleveland. Shortly after the discovery of gold in California he crossed the plains to the Pacific coast, where he became successful as a mine owner and operator. He was sheriff of Tuolumne County and from 1863 to 1867 served as a member of the California State Senate, removing in the latter year to Nevada. There he became superintendent and part owner of the famous Crown Point silver mine, the subsequent development of which brought him a large fortune. In State politics, he gained great influence with the miners, by whom he was known as the Nevada Commoner. Elected by the Nevada Legislature (1873) to succeed James Nye in the United States Senate, he was reëlected as a Republican in 1879, 1885, and 1891, and as a Silverite in 1897. In the Senate he was long a member of the Committee on Post Roads, where he was an indefatigable worker in behalf of the extension of the system in the Pacific States, and of the Committee on Mines and Mining, to which his practical knowledge proved of the greatest value. His identification with the silver movement dates from August, 1875, when he became chairman of the monetary commission to examine and report upon the question of bimetallism. After that date he stood consistently as one of the foremost champions of bimetallism in the country, favored the free coinage of silver without regard to the rest of the world, and on that issue left the Republican party and supported Bryan in 1896. During the campaign of 1900 he returned to the Republican party, though without giving up his free-silver theories. He retired in 1903.

JONES, John Winter (1805–81). An English librarian, of Welsh descent, born in London. After education at St. Paul's School he studied law, but had to abandon the profession owing to an illness which affected his voice. When 18 years old, he had published a translation of the polyglot quotations in Blackstone's *Commentaries*, and he now devoted himself to the acquisition of foreign languages and the study of literature. In 1835 he became connected with the civil service and, as secretary to the charity commissioners, during two years traveled over the greater part of England. In 1837 the commissioners recommended him as an assistant in the British Museum Library, with which institution he was thenceforth identified. He was associated with Panizzi and Richard Garnett in the remodeling of that great institution, and the catalogue commenced in 1839, for which he, with others, framed scientific rules, and of which he was the general reviser, is a monument to his indefatigable industry, erudition, and judgment. On Panizzi's strong recommendation, when the latter resigned in 1866, Jones was appointed principal librarian and held that position till 1878, when ill health necessitated his retirement. Numerous interesting catalogues and other works were published under his direction; he translated and edited several valuable works of early travels, notably *Divers Voyages Touching the Discovery of America*, issued by the Hakluyt Society (1850), and was a prolific contributor to the *New Biographical Dictionary* of the Society for the Diffusion of Useful Knowledge.

JONES, Leonard Augustus (1832–1909). An American jurist and writer on legal topics. He graduated from Harvard College in 1855 and from Harvard Law School in 1858 and then practiced law until 1874. Thereafter he was associate editor (1874–1904) and editor in chief (1904–07) of the *American Law Review*. He became judge of the land court in 1898 and thereafter until his death was chief judge of that court. His writings include: *An Index to Legal Periodical Literature* (2 vols., 1888–89); *Legal Forms* (6th ed., rev., 1909); and treatises on the law of *Real Property* (2 vols., 1896); *Collateral Securities and Pledges* (3d ed., 1912); *Corporate Bonds and Mortgages* (3d ed., 1907); *Landlord and Tenant* (1906); *Mortgages of Real Property* (6th ed., 1904); *Mortgages on Personal Property* (5th ed., 1908).

JONES, Lewis Ralph (1864–). An American botanist, born at Brandon, Wis. He was educated at Ripon College (1883–86) and at the University of Michigan (Ph.B., 1889; Ph.D., 1904). From 1889 to 1910 he taught natural science at the University of Vermont and was botanist of the Vermont Experiment Station, and thereafter he was professor of plant pathology at the University of Wisconsin. He was special agent of the United States Bureau of Plant Industry in 1904, served as president of the Botanical Society of America (1912) and of the Phytopathological Society of America (1909), became one of the editors of the *American Journal of Botany*, contributed to *Webster's New International Dictionary*, and published several contributions on the diseases of plants.

JONES, Owen (1809–74). An English architect and designer, born in London, the son of Owen Jones, the Welsh antiquary. He studied six years in the office of the architect Vulliamy and at the Royal Academy. He traveled in the East and Europe and in 1834 went to Granada, which he revisited in 1837 for material for his *Plans, Elevations, Sections, and Details of the Alhambra* (1842–45, with 101 plates in color). He was one of the superintendents of works at the exhibition of 1851 and a year later had charge of the decorations of the Egyptian, Greek, Roman, and Alhambra courts at the Crystal Palace, Sydenham. The casts decorating the palace were also collected by him and Sir Digby Wyatt. As an architect, he built St. James's Hall, London. He was particularly successful with interior decoration, in which he was influenced by his love of Arabic ornamentation and color. He was vice president of the Royal Institute of British Architects and was the winner of various medals for designs. His works include: *Designs for Mosaic Tessellated Pavements* (1842); *The Illuminated Books of the Middle Ages* (1844), with Humphreys; *The Polychromatic Ornament of Italy* (1846); *An Attempt to Define the Principles which should Regulate the Employment of Color in the Decorative Arts* (1852); his famous *Grammar of Ornament*

(1856, 100 plates); *One Thousand and One Initial Letters* (1864); *Seven Hundred and Two Monograms* (1864); *Examples of Chinese Ornament* (1867).

JONES, Peter (1802–56). A Canadian Indian missionary and educator. He was born at Burlington Heights, Upper Canada, a member of the tribe of Ojibway Indians. Through the aid of influential friends he obtained an excellent education. In 1833 he was ordained a Wesleyan Methodist minister and from that time until his death was a zealous and influential missionary. He traveled much and preached in the United States and Great Britain. When in the latter country he did much to inform and rightly guide opinion in political and religious circles as to the position and treatment of the various Indian tribes in North America. He prepared several educational books for the use of the Ojibways, translated the Gospels of Matthew and John into their language, and published *My Life and Journals* (1860) and *History of the Ojibway Indians, with Special Reference to their Conversion to Christianity* (1861).

JONES, Samuel (1734–1819). An American jurist. He studied law with William Smith, the New York historian; was a Tory throughout the Revolution, but not an active one; and became a leader of the Federalist party and a member of the State Convention of 1788 which adopted the Constitution. He became recorder of the city of New York in 1789 and in the same year revised the State statutes with Richard Varick. In 1796 he was made State comptroller, the functions of which office he had legally prescribed at the request of John Jay. He was a brilliant jurist and wrote many papers for the New York Historical Society.

JONES, Samuel Porter (1847–1906), commonly known as Sam Jones and often styled the Mountain Evangelist. An American evangelist of the Methodist Episcopal Church South, born in Chambers Co., Ala. He was admitted to the bar in 1869 and for a time practiced successfully. His professional life was ruined by his passion for drink, but after his father's death, in 1872, he was converted, in the same year was ordained a clergyman of the Methodist Episcopal Church South, and at once began preaching. His success from the first was remarkable, and he became widely known as a speaker on evangelistic, revival, and Chautauqua platforms. Many of his sermons, discourses peculiar to themselves in their unconventionality, have been published. These include: *Famous Stories of Sam P. Jones* (1908); *Popular Lectures of Sam P. Jones* (1909); *Sam Jones's Revival Sermons*, compiled by his daughter, Annie Jones Pyron (1912); *Lightning Flashes and Thunderbolts*, compiled by J. S. Shingler (1912).

JONES, Thomas (1731–92). An American lawyer and Tory, born at Fort Neck, Long Island. He graduated from Yale in 1750, studied law, was admitted to the bar in 1755, became city attorney and recorder, and in 1773 succeeded his father, David Jones (1699–1775), as judge of the Supreme Court, an office which he held under the crown. He was twice captured by the Revolutionary forces and twice paroled; in 1779 he was captured in spite of his parole and exchanged (1780) for Gen. Gold Selleck Silliman. A year afterward he removed to England and was attainted in 1782 by the New York Legislature. Jones wrote a *History of New York during the Revolutionary War*, published by the Historical Society in 1879. The work has the value of a sole contemporary document and is Loyalist in sympathies.

JONES, Thomas ap Catesby (1787–1858). An American naval officer, born in Virginia. He entered the navy in 1805 and three years later was sent to the Gulf of Mexico, where he was engaged until the outbreak of the War of 1812 in suppressing piracy, smuggling, and the slave trade. He saw no active service against the British until near the end of the war, when he attempted with his squadron of five gunboats manned by 182 men to bar the passage across Lake Borgne to the fleet under Vice Admiral Cochrane, which was transporting General Packenham's army to New Orleans. He anchored his squadron in such a position that the deep-draft vessels of the British could not approach it and so forced the latter to attack in their tenders. After an obstinate resistance, in which he inflicted severe loss upon his assailants, but during which he was himself badly wounded, his vessels were captured. In 1820 Jones was promoted to the rank of commander and in 1829 to that of captain. At this time conditions in the Hawaiian Islands were attracting attention in the United States and in England. The missionaries, most of whom were Americans, had secured practical control of the government; but opposed to them was an aggressive party, composed of sailors and merchants, which was headed by the British Consul, Richard Charlton, who wished to secure the cession of the islands to Great Britain. Commander Jones in the sloop of war *Peacock* was sent out in 1826 to secure payment of debts claimed by American citizens and to endeavor to restore peace between the warring factions. He remained almost three months, collected the debts, denied publicly Charlton's assertion that the islands were a British dependency, and presided over a meeting at which the missionaries met the charges of their adversaries. In 1842, while commanding the Pacific squadron, he heard that war had been declared against Mexico, and, believing from the actions of the British warship *Dublin* that that government intended to annex California, he landed a force at Monterey and took possession in the name of the United States. For this indiscretion he was temporarily removed from his command.

JONES, Thomas Rupert (1819–1911). An English geologist, born in London. He was sent to school at Taunton and Ilminster and afterward studied medicine, but in 1850 became assistant secretary to the London Geological Society. He was professor of geology at the Royal Military and Staff Colleges, Sandhurst, from 1862 till superannuated in 1880. His works include: *Monograph of the Cretaceous Entomostraca* (1849); *The Tertiary Entomostraca in England* (1856); *Monograph of the Fossil Estheriæ* (1862); *Monograph of the Arctic and North Atlantic Foraminifera* (1865); *Foraminifera of the Crag* (1866); *Monograph of the Carboniferous Cypridinidæ* (1874); *Palæozoic Phyllopoda* (1888). He edited numerous books on natural science and contributed extensively to scientific periodicals.

JONES, Walter (1865–). An American physiological chemist, born at Baltimore, Md. He graduated from the Baltimore City College in 1884 and from Johns Hopkins University in 1888 (Ph.D., 1891). He served as professor of chemistry at Wittenberg College, Springfield, Ohio, in 1891–92, and as professor of analytical chemistry at Purdue University in 1892–95. He then returned to Johns Hopkins, where he was an assistant in physiological chemistry (1895–98), associate (1898–1902), associate professor (1902–08), and professor after 1908. The results of his many investigations in his field were published in various technical journals and in *Nucleic Acids* (1914).

JONES, WESLEY LIVSEY (1863–). An American legislator. Born near Bethany, Ill., he graduated from Southern Illinois College in 1886 and was admitted to the bar in the same year. He moved to the Territory of Washington in 1889 and there began the practice of law in 1890. He participated in the Blaine campaign of 1884 and the Harrison campaign of 1888 in Illinois and in all subsequent campaigns in the State of Washington. He was a Republican member of the Fifty-sixth to the Sixtieth Congress (1899–1909), was elected United States Senator for Washington for the term of 1909–15, and in 1914 was reëlected.

JONES, SIR WILLIAM (1746–94). A famous English Orientalist, Indian jurist, and littérateur. He was born in London, Sept. 28, 1746, and was sent to Harrow in 1753. In 1764 he was entered at University College, Oxford, where he was enabled to gratify his desire for a knowledge of the Oriental languages. In 1765 he left Oxford, to become tutor to Earl Spencer's eldest son, with whom he remained five years. In 1770 he published, at the request of the King of Denmark, a *Life of Nadir Shah*, translated into French from the Persian; in the following year, a *Persian Grammar* (1772; several times republished); and in 1774 his *Poeseos Asiaticæ Commentariorum Libri Sex*, republished by Eichhorn at Leipzig in 1776. In 1780 he completed a translation of the seven Arabic poems known as the *Moallakât*, which obtain their collective name from being suspended in the temple at Mecca; wrote an essay *On the Legal Mode of Suppressing Riots*, and another, entitled *Essay on the Law of Bailments* (1781), and two or three odes. In March, 1783, Jones was knighted and obtained a judgeship in the Supreme Court of Judicature in Bengal, and landed at Calcutta in September. He at once set about the acquisition and promulgation of the knowledge of Oriental languages, literature, and customs. He established the Royal Asiatic Society, of which he was the first president. To the volumes of the *Asiatic Researches* Sir William contributed largely. Besides these, he wrote and published a story in verse, called *The Enchanted Fruit, or the Hindu Wife*, and a translation of an ancient Indian drama, called *Sakuntala, or the Fatal Ring* (1789), which aroused widespread interest in the literary circles of Europe. A translation by him of the *Ordinances of Manu* (q.v.) appeared in 1794. He was busily employed on a digest of the Hindu and Mohammedan laws at the time of his death (April 27, 1794). Jones was one of the greatest linguists and Oriental scholars that England has produced, and his enthusiasm and literary ability did much to arouse general interest in the subject. The East India Company erected a monument to his memory in St. Paul's Cathedral and a statue in Bengal. A complete edition of his works in six volumes was published by Lady Jones in 1799, and another appeared in 13 volumes (London, 1804–07), with a life of the author by Lord Teignmouth (republished, London, 1835). His translation of Jayadéva's *Gitagôvinda* was republished in 1894 (Calcutta). Consult the article by H. M. Stephens in the *Dictionary of National Biography*, vol. xxx (London, 1892).

JONES, WILLIAM (1871–1909). An American scholar, anthropologist, and writer, of Welsh, English, and Indian descent, born in Indian Territory and reared, on the Sauk and Fox Reservation, by his grandmother, the daughter of Wa-shi-ho-wa, a Fox chief. He attended Hampton Institute and Phillips Andover Academy, graduated at Harvard in 1900, received the Ph.D. degree at Columbia, and collected Sauk, Fox, and Ojibwa ethnological specimens for the American Museum of Natural History, New York. An Algonquian linguist, he prepared field notes and Indian texts. While in the Philippines, sending material to the Field Museum, Chicago, he was fatally wounded by traitorous natives. Among his writings are: *The Algonkin Manitou; Kickapoo Texts; Fox Texts; Some Principles of Algonquian Word-Formation* (1904); *Mortuary Observances and the Adoption Rites of the Algonquin Foxes of Iowa.*

JONES, WILLIAM, OF NAYLAND (1726–1800). An English divine. He was born at Lowick, Northamptonshire; educated at the Charterhouse and University College, Oxford; ordained priest (1751); became successively curate of Finedon, vicar of Bethersden, rector of Pluckley, Paston, and perpetual curate of Nayland (1777). He adopted, while at Oxford, the philosophy of Hutchinson, as opposed to that of Sir Isaac Newton, and subsequently advocated it with great erudition and ingenuity. He was a man of vast learning, an able theologian, and proficient in music, and one of the most prominent in the High Church party of his day. He wrote with vigor against the principles disseminated during the French Revolution and illustrated by it. He wrote treatises on music and composed anthems, and founded the *British Critic* (1793). A complete collection of his works was published in 12 volumes in 1801, with a short life by W. Stevens (new ed. in 6 vols., 1810). His life forms part v of the *Biography of English Divines* (London, 1849). Consult also article by J. H. Overton in *Dictionary of National Biography*, vol. xxx (ib., 1892).

JONESBORO, jōnz'bŭr-ô. A city and the county seat of Craighead Co., Ark., 67 miles by rail northwest of Memphis, Tenn., on the St. Louis and San Francisco, the St. Louis Southwestern, and the Jonesboro, Lake City, and Eastern railroads (Map: Arkansas, E 2). It is a manufacturing centre of some importance, having flouring and lumber mills, peanut-hulling factory, cotton-oil mill, basket and handle factories, brickworks, cotton gins, machine shops. Jonesboro is also the distributing centre for a wide agricultural region. The city contains a State agricultural school, Elks Home, Federal building, and the St. Bernards Hospital. Settled in 1870 and incorporated in 1882, Jonesboro is governed under a charter of 1892 which provides for a mayor, elected biennially, and a unicameral council. The water works, electric-light plant, and sewer system are owned by the city. Pop., 1900, 4508; 1910, 7123.

JONESBORO. A city and the county seat of Clayton Co., Ga., 20 miles south of Atlanta, on the Central of Georgia Railroad (Map: Georgia, B 2). It has a tire factory. Pop., 1900, 877; 1910, 970. Here in August, 1864, was fought a stubborn battle between the Federal General Howard, at the head of a portion of General Sherman's army then besieging Atlanta, and the Confederate General Hardee, commanding about half of the army which, under General Hood, was endeavoring to hold that city. Howard had been sent to destroy the railroad at this point, and Hardee at 2 P.M. on the 31st made an attempt to drive him across Flint River, but was repulsed with considerable loss and forced to retreat. This victory placed the Federals in control of the Macon road and compelled General Hood hurriedly to evacuate Atlanta. The loss of the Federals in killed, wounded, and missing was about 300; that of the Confederates, while never actually ascertained, was probably about 2000. Consult Sherman, *Memoirs* (2 vols., New York, 1875), and Cox, *Atlanta*, in the "Campaigns of the Civil War Series" (ib., 1882).

JONGE, yŏng′e, JOHANNES CORNELIS DE (1793–1853). A Dutch historian, born at Zierikzee and educated at Leyden. There he became acquainted with Van Wijn, whose assistant he was until 1831, when he succeeded his master as keeper of the Dutch archives. Jonge had shown his patriotism by volunteering for the Hundred Days, and in his later years he held various representative offices. His historical works form the actual basis of Dutch history; they include: *Verhandeling over den oorsprong der hoeksche en kabeljaauwsche twisten* (1817); *Het derde stand in de staatsvergaderingen* (1824); the great work, *Geschiedenis van het Nederlandsche zeewezen* (1833–48; 2d ed., 1858); and a biography of Van Wijn (1832).

JONGKIND, yŏng′kĭnt, JOHANN BARTHOLD (1819–91). A Dutch landscape painter and etcher. He was born at Latrop, near Rotterdam, went to Paris while quite young, and studied chiefly with Isabey. There remain but scant details of his life at Paris, despite the fact that he numbered Baudelaire, Théophile Gautier, and Zola among his friends. Corot, Daubigny, and Monet were also of the number—fervent admirers of his work. None the less his life was passed in poverty, wandering from place to place, forever at work, but finding little sale for his beautiful productions. His privations and the bitterness they brought ended in mental collapse. From 1860 to his death, at La Côte Saint-André in 1891, Jongkind, like his great compatriot, Van Gogh, was insane.

Jongkind belongs to the Dutch school in the character of his outlook on nature and to the French in technique—it has been well said that he is the artistic descendant of Van Goyen, Ruysdael, and Van de Velde. He carried the naturalism of the men of 1830 to a point unattained by any of them and is the link between their art and that of the Impressionists. Jongkind's ceaseless industry made him a master of any medium he cared to work in—oils, water colors, pencil, etching, or lithography. He excelled especially in the handling of water color, and in etching he is one of the greatest masters of the nineteenth century. With a sure draftsmanship and with unsurpassed freedom and economy of means, he jotted down his impressions of nature directly on the copper. Both in painting and etching he succeeded especially with the canals and skies of his native land, but his French subjects are scarcely less attractive. His painting is well represented at Amsterdam in the Rijks-Museum and the Municipal Gallery, and in the Moreau-Nelaton collection of the Louvre; also in several French provincial museums and at Brussels and Amsterdam. Consult Frantz, "Johann Barthold Jongkind," in the *International Studio*, vol. xxxvi (New York, 1908–09).

JONGLEUR, zhôɴ′glẽr′ (OF., from ML. *joculator*, jester, juggler, from Lat. *joculari*, to jest, juggle, from *joculus*, dim. of *jocus*, jest, joke). A title given in France during the Middle Ages to members of a class of public entertainers or minstrels, who wandered from place to place singing, as a rule, the compositions of others, though some confusion is occasionally found between the functions of the jongleur and the troubadour (q.v.). The jongleur, however, was of a lower and purely mercenary class. See also FRENCH LITERATURE.

JONGLEUR DE NOTRE DAME, de nō′tr′ dȧm, LE (Fr., The Juggler of Our Lady). An opera by Massenet (q.v.), first produced in Monte Carlo, Feb. 18, 1902; in the United States, Nov. 27, 1908 (New York).

JÖNKÖPING, yẽn′chē-pĭng. Capital of the län of the same name, Sweden, at the south extremity of Lake Wetter, 85 miles east of Göttenberg. It is regularly and well built, and is situated among lakes and pine-clad hills, but is somewhat low and unhealthy. Its suburbs on surrounding hills are better placed (Map: Sweden, E 8). It is one of the most important industrial towns of Sweden and is famous for its manufactures of matches, founded in 1844 by John Eduard Lundström. Other important products are paper and wood pulp, arms, castings, carpets, tobacco, and machinery. The maritime trade is considerable. It is the seat of a court of appeal. Jönköping is an ancient town dating from legendary times; it received its town charter in 1284. Pop., 1901, 23,143; 1911, 26,969.

JONOPUS, an epiphyte. See Plate of EPIPHYTES.

JONQUIÈRES, zhôɴ′kyȧr′. A town in Chicoutimi Co., Quebec, Canada, on the Quebec and Lake St. John Railway, 10 miles east of Chicoutimi (Map: Quebec, G 2). Among its industrial establishments are pulp and paper mills, a sash and door factory, planing mill, furniture factory, and foundry. Pop., 1911, 2354.

JON′QUIL (Fr. *jonquille*, from Lat. *juncus*, reed). A name given to certain species of *Narcissus* (q.v.) with rushlike leaves. The common jonquil (*Narcissus jonquilla*), a native of the south of Europe, is one of the most common bulbous-rooted plants in flower borders. It has from two to six yellow flowers at the summit of its scape (leafless stem). The sweet-scented jonquil (*Narcissus odorus*), also a native of the south of Europe, is another species very generally cultivated. Like other species of *Narcissus*, these are readily grown in forcing houses. The flowers are used in the manufacture of perfumes. All varieties are ordinarily propagated by bulbels. New varieties are obtained from seeds.

JON′SON, BEN (BENJAMIN) (?1573–1637). An English dramatist, born probably at Westminster in 1573. His grandfather belonged to one of the Johnstone families of Annandale.

His father, who was a "minister," died a month before the dramatist's birth; and his mother soon married a "master bricklayer" living near Charing Cross. Ben was sent to Westminster School at the expense of William Camden, then second master there, and a famous scholar, to whom he was surely indebted for the beginnings of his solid learning. It is commonly stated, on the authority of Fuller, that from Westminster he proceeded to St. John's College, Cambridge. For the assertion there is, however, no real evidence. After he had won a name in letters, Jonson received from each university the degree of M.A., but—in his own words—"by their favour, not his studie." He was taken from school and put to the craft of his stepfather. Disliking this occupation, he went to the Low Countries, where he joined the English troops against Spain. While there, he killed one of the enemy in view of both armies. He returned to England about 1592 and "betook himself to his wonted studies." Near this time he also married a "wife who was a shrew yet honest." Precisely when he began writing for the stage is not known; but the date is probably not earlier than 1595. Two years later he was both actor and playwright in Henslowe's company. In 1598 he wrote a tragedy for this company and was mentioned by Meres as one of "the best for tragedy." These plays are lost. His first extant play is the famous *Every Man in his Humour*, performed by the lord chamberlain's servants, at the Globe Theatre, in September, 1598. Shakespeare himself played a part in this first noteworthy English comedy of character. While the play was on the stage, Jonson quarreled with an actor in Henslowe's company named Gabriel Spenser and killed him in a duel (September 22). He was imprisoned for a short time; but, by pleading benefit of clergy, he escaped with branding on the left thumb and loss of goods and chattels. The next year Jonson produced *Every Man Out of his Humour* and perhaps had already written *The Case is Altered*, an adaptation of Plautus. During the next 15 years he brought out *Cynthia's Revels* (1600), *The Poetaster* (1601), *Sejanus*, a tragedy (1603), *Catiline*, a tragedy (1611); and his greatest comedies, *Volpone* (1605), *Epicœne, or the Silent Woman*, best of all (1609), *The Alchemist* (1610), and *Bartholomew Fair* (1614). In 1616 came a poorer comedy, *The Devil is an Ass*. The regular stage Jonson now forsook for 10 years, and his later comedies have little interest. At his death he left fragments of a beautiful pastoral, *The Sad Shepherd, or a Tale of Robin Hood*.

A CULTIVATED JONQUIL.

With the accession of James he had begun for the court a series of festive performances which he classed as entertainments, barriers, and masques. They had respectively, as the centre of interest, a complimentary speech, a mock tournament, and a masqued dance. They were presented with elaborate machinery furnished by Inigo Jones (q.v.). But the general plan and the verse, often exquisite, were Jonson's. Besides masques, Jonson also composed many poems. Scattered through his comedies, written mostly in prose, are well-known songs, as "Still to be neat, still to be drest." But his larger poetic fame rests upon his charming epigrams (short poems embodying one idea), and the collections entitled *The Forest* and *Underwoods*. Unsurpassed of their kind are the lines "On Lucy, Countess of Bedford," and the "Epitaph on the Countess of Pembroke." And in a series of essays called *Discoveries* he displayed his solid character and ripe wisdom.

During these years Jonson lived a varied life. His combativeness led to "many quarrels" with Marston, one of his collaborators, whom he "beat," and satirized, in conjunction with Dekker in the *Poetaster*. When, in 1604, Chapman and Marston were sent to prison for certain passages in their *Eastward Ho*, offensive to the court, Jonson, who had a slight hand in the play, voluntarily joined them (1605). The next year he was also imprisoned with Chapman. But for the most part he enjoyed the favor of the King, whom he pleased by his masques and in other ways. In 1616 he was granted a royal pension of 100 marks, afterward raised to £200, and might have been knighted, it is said, had he wished. In 1613 he was abroad with the son of Sir Walter Raleigh, to whose *History of the World* he contributed the account of the Punic wars. In the summer of 1618 he traveled on foot to Scotland, returning the next year. He visited the poet Drummond at Hawthornden, about 11 miles from Edinburgh, in conversations with whom he spoke very freely of his contemporaries and of his own early life. His friends among the aristocracy were many, especially among the Sidneys. From the Earl of Pembroke he received every year £20 to buy books. Convivial by nature, he ruled as monarch at the hostelries where gathered poets and dramatists, first at the Mermaid and then at the Devil Tavern. Of Shakespeare, who no doubt was one of his early associates, he said late in life: "I loved the man and do honour his memory, on this side idolatry, as much as any." He died Aug. 6, 1637, and was buried in Westminster Abbey, where his tombstone bears the inscription, "O rare Ben Jonson." Jonson's work is the best representation of classic ideals in the English drama, adapting to contemporary life the spirit of ancient comedy. His aim was to depict for ridicule and satire the "humours" of society, i.e., affectations in conduct, dress, and speech. His comedies he aptly described as "comical satires."

The first volume of the first folio edition of Jonson's *Works*, as revised by himself, was published in 1616. *Every Man in his Humour*, as published in 1601, was Italian in setting. In the folio of 1616 it first appeared as now generally known, with its scene shifted to London and the names of the characters in English. The second volume of the first folio appeared in installments between 1630 and 1641. The only critical edition in the nineteenth century was that of Gifford (9 vols., London, 1816; revised by Cunningham, 1875). It is not a careful piece of work. A convenient edition of the plays is *Complete Plays* (2 vols., New York and London, 1910), with introduction by F. E. Schelling. Selected plays, edited by B. Nicholson, with an introduction by C. H. Herford, were published in the *Mermaid Series* (3 vols., London and New York, 1894 and 1903).

Bibliography. The main source for Jonson's life is *Conversations with Drummond*, edited by Laing, Shakespeare Society (London, 1842). Consult also: John Dryden, *Essay on Dramatic Poesy* (ib., 1668); W. Gifford, "Memoirs of Ben Jonson," in his *Works*, vol. i (ib., 1872); Soergel, *Die englischen Maskenspiele* (Halle, 1882); J. A. Symonds, *Life of Johnson*, in "English Worthies Series" (London, 1886); A. C. Swinburne, *Study of Johnson* (ib., 1889); Fleay, *English Drama* (ib., 1891); Koeppel, *Quellen-Studien zu den Dramen Ben Jonsons* (Leipzig, 1895); F. E. Schelling, *Ben Jonson and the Classical School* (New York, 1898); Ward, *History of English Dramatic Literature* (London, 1899); A. H. Thorndike, "Ben Jonson," in *Cambridge History of English Literature*, vol. vi (Cambridge, 1907–10); Paul Birck, *Literarische Anspielungen in den Werken Ben Jonson's* (Strassburg, 1908), containing a bibliography; C. R. Baskerville, "English Elements in Jonson's Early Comedy," in University of Texas, *Bulletin*, "Humanistic Series," No. 178 (Austin, Tex., 1911); Mina Kerr, *Influence of Ben Jonson on English Comedy, 1598–1642* (Philadelphia, 1912), containing a bibliography.

JONSON, Cornelius. See Janssen.

JÓNSSON, yōns'sōn, Finnur (1704–89). An Icelandic bishop and historian. He was born at Hitardal, was educated at the University of Copenhagen, and was appointed Bishop of Skálholt in 1754. The public instruction in the island was greatly improved under his direction. Of his numerous works in Latin and Icelandic the most valuable is *Historia Ecclesiastica Islandiæ* (4 vols., Copenhagen, 1772–78). This is really the entire history of Iceland from earliest times to Jónsson's day, a learned work and important as a source of Icelandic history and literature.

JÓNSSON, yōns'sōn, Finnur (1858–). A noted Icelandic philologist and historian of literature, born at Akureyri. He was educated at Reykjavik and at the University of Copenhagen, where he became docent in northern philology in 1887 and professor in 1898. Learned and energetic, he published many critical editions of Old Norse texts, the most important being *Den norsk-islandske Skjaldedigtning* (1908; new ed., 1914). But his greatest work is *Den oldnorske og oldislandske Literaturs Historie* (3 vols., 1894–1902; abbreviated ed. in Icelandic, 1904–05, in Danish, 1907), the most detailed of all works on this subject, and a standard. His foremost linguistic works are *Det norsk-islandske Skjaldesprog* (1901) and *Islandsk Sproglære* (1905).

JOP'LIN. A city and one of the county seats of Jasper Co., Mo., 155 miles south of Kansas City, on the Kansas City Southern, the Missouri Pacific, the St. Louis and San Francisco, the Missouri, Kansas, and Texas, and three other railroads (Map: Missouri, B 4). It is of considerable commercial importance as the distributing point for a large agricultural district, but is known principally for its extensive mining interests, being the trade centre of the vast zinc and lead fields of southwestern Missouri. The industrial establishments include smelting, paint, and white-lead works, large foundries and machine shops, a wagon factory, a cooperage, ironworks, a candy factory, and flouring mills. Among the more notable structures are the courthouse, the opera house, several hotels, the Young Men's Christian Association building, a Federal government building ($155,000), the Frisco Lines station, and a Carnegie library. Joplin adopted the commission form of government in 1914. One of the light plants is owned by the municipality. The city has an assessed valuation of $10,042,000, while its debt is less than 4 per cent of this amount. The receipts for the year 1912 were $555,000, while its expenditures amounted to $530,000. Settled about 1870, Joplin was first incorporated in 1873. Since 1890 it has grown rapidly. Pop., 1900, 26,023; 1910, 32,073; 1914 (U. S. est.), 32,848.

JOP'PA (Heb. *Yāphō*, beauty). The biblical name of the seaport of Jerusalem, the modern Jaffa (Map: Turkey in Asia, C 4). It was a very ancient Phœnician town and was fabled to be the place where Andromeda (q.v.) was chained to the rock. It is mentioned in Egyptian and Assyrian inscriptions. In the Old Testament it is referred to as part of the lot of Dan (Josh. xix. 46), as the place where timber from Lebanon was landed for transportation to Jerusalem (2 Chron. ii. 16; Ezra iii. 7), and the port at which Jonah took passage for Tarshish (Jonah i. 3). It was the home of Dorcas (Acts ix. 36–42), and at the house of Simon the tanner Peter received the vision which he interpreted to mean that Gentiles as well as Jews were to be admitted to the Christian Church (Acts x. 1–23). Joppa was a point of importance and suffered much in the Maccabæan and Roman wars. It was made a bishop's see under Constantine and attained great prosperity in the time of the Crusades, when it became one of the landing places of the warriors of Christendom. It was stormed by the French in 1799, and a shameful massacre of Turkish prisoners was then perpetrated. See Jaffa.

JORDAENS, yŏr'däns, Jacob (1593–1678). A Flemish historical, genre, and portrait painter, one of the chief masters of the school. He was born at Antwerp, May 19, 1593, the son of a cloth merchant. He was a pupil of Adam van Noort, the master of Rubens, and remained with that master when his other pupils left him, finally marrying his daughter. In 1615 he was admitted to the Guild of St. Luke as a painter in water colors, though most of his work was in oils. He never studied in Italy as did the other principal Flemish painters of his day, but this had the advantage of making him more essentially Flemish. He was influenced by Rubens and associated with him in work, but there is no evidence to show that he was his pupil. Rubens gave him a commission for a series of cartoons for tapestry which he had received from the King of Spain. Jordaens also painted "Vertumnus and Pomona" for this monarch, as well as a picture for Charles I of England (1640) and a passion suite for Charles Gustavus of Sweden (1665). In 1652 he decorated the palace of the widow of Frederick Henry of Orange, Stadtholder of Holland, near Scheveningen. These mural paintings are his best works. The principal one represents the "Triumph of the Stadtholder," who is seated in a triumphal car drawn by four white horses. It is imposing in effect and masterly in treatment. Jordaens had a large number of pupils, who assisted him in his work, and on the death of Rubens he was considered the chief painter of his time. He acquired wealth and erected a patrician house at Antwerp, filled with works of art. Notwithstanding his numerous commissions for the Catholic clergy, he was an ardent Calvinist and suffered some persecution for his faith. He died in Antwerp, Oct. 18, 1678.

The characteristics of the Flemish school, its exaggerated treatment of form and crude humor, are more evident in Jordaens than in any other painter. Like Rubens, he painted in full light red healthy faces and figures inclined to corpulency. His color was even warmer than that of his great contemporary, and his best pictures possess a peculiar and effective golden glow. His excessive realism, however, often descends into coarseness. He was a most prolific painter, whose works abound in all the principal European galleries.

Among his chief religious and mythological paintings are "Christ Driving the Money Lenders from the Temple" and the "Four Evangelists," in the Louvre; the "Entombment of Christ," the "Last Supper," "Commerce and Industry Protecting the Arts," "Pegasus," the "Divine Law Protecting Human Law," in the Museum of Antwerp; the "Martyrdom of St. Apollonia," "St. Charles Borromeus Praying for the Pest-Stricken at Milan," and "St. James," in the church of the Augustinians, Antwerp. Others are in the Museum of Brussels, The Hague, Brunswick, Cassel (which possesses, among other canvases, a remarkable "Triumph of Bacchus"), and Madrid. In the Gallery of Dresden there are a "Presentation in the Temple" and "Diogenes Seeking an Honest Man"; at Vienna, "Jupiter and Mercury," with "Philemon and Baucis," one of his best mythological pictures. The Metropolitan Museum in New York possesses "The Philosophers," a "Holy Family," and a fine sketch.

His genre pieces fall mainly into two classes: the first, entitled "The King Drinks" or "Epiphany," are scenes showing the Flemish celebration of the festival. Of this group the best examples are at Cassel, Valenciennes, in the Louvre, Brussels, and in the Academy Museum, St. Petersburg. Others illustrate the Flemish proverb "As the old sing, so the young peep," or, as we should say, "Like parent, like child." Of this subject there are versions in Antwerp, the Louvre, Dresden, and Würzburg. He painted also a few portraits, some of great power, such as "Van Surpale and his Wife" (Duke of Devonshire, London); "Jan Wierts, his Wife," at Cologne; the admirable "Unknown Man," formerly thought to be Jordaens, in the Uffizi; a family group, at Cassel; the "Lady with the Locket," Vienna Academy; the supposed portrait of De Ruyter, in the Louvre; and the fine portrait of an old man, at Budapest.

Bibliography. The chief authority on Jordaens is Max Rooses, an English translation of whose extensive monograph was published at London in 1908. Briefer monographs are by Génard (Ghent, 1852), by Paul Buschmann (Brussels, 1905), by Fierens-Gevaert, in *Les grands artistes* (Paris, n. d.), and by Aric van Veen, "Jacob Jordaens," in *Elseviers Geïllustreerd Maandschr*, vol. xv (Amsterdam, 1905). An album of reproductions of his works was published at Antwerp in 1905.

JOR′DAN (Heb. *Yardēn;* probably connected with Syr. *yardā*, lake, Ar. *wird*, watering place). The principal river of Palestine, called Esh-Sheriah or Esh-Sheriah el-Kebir by the Arabs (Map: Palestine, D 3). Starting from the mountains in the north of Palestine, it flows southerly, passes through the small lake Huleh (the biblical waters of Merom, q.v.) and the Lake of Tiberias or of Gennesaret (Sea of Galilee), and enters the north end of the Dead Sea. The main sources of the Jordan are three in number: the largest, Nahr Leddan, issues from the mound called Tell el-Kadi (hill of the judge) near ancient Dan; the second, the Nahr Banais, springs from crevices between and from under rocks that choke the mouth of a cave near Banias (the ancient Paneas, Cæsarea Philippi, q.v.); and the third, smallest and most remote, the Nahr Hasbani, rises near Mount Hermon. Uniting their waters above Lake Huleh, these streams give rise to the Jordan. Above Lake Huleh the river is 30 to 100 feet in width, just below the lake about 60 feet, and in the valley between the Lake of Tiberias and the Dead Sea from 90 to 250 feet, and is 540 feet wide at its mouth. In the flood season it reaches a breadth of even 2 miles. At ordinary times it is fordable in a great many places—in some places even when the river is in flood. Its usual depth between the Lake of Tiberias and the Dead Sea is 2 to 3 feet; just below Lake Huleh it is about 15 feet deep; the depth of course increases in the flood season. The river is not navigable. In the flood season dangerous rapids are found. In its course the river makes a steep descent. Lake Huleh is about 7 feet above the level of the Mediterranean, while the Lake of Tiberias is about 680 feet, and the Dead Sea about 1300 feet below that level; so that between Huleh and the Lake of Tiberias the river falls about 69 feet to the mile, between the Lake of Tiberias and the Dead Sea about 9 feet to the mile. The valley is a portion of the great rift valley, or depression which extends nearly across Africa. It has four main affluents: the Sheriat el-Menadireh (Hieromax, Yarmuk) and Zerka (Jabbok) on the east; the Jalud and Faria on the west. A little below Huleh the river is crossed by a bridge, the Jisr Benat Yakob, over which the road from Damascus to Galilee passes, and a few miles below the Lake of Tiberias is another bridge, the Jisr Mujamia. Below the Lake of Tiberias the valley of the Jordan presents a most remarkable formation. Within a larger valley called the Ghor is a smaller valley called the Zor, and through this the Jordan flows. The precipitous ridges which inclose the valley rise in some places to the height of 3000 or 4000 feet. The width of the Ghor is from somewhat over 1 mile to 16 miles, of the Zor from ½ mile to 2 miles. The river runs through the Zor in such a tortuous course that its total length is more than 200 miles, although the distance in a straight line is but 65 miles. Near the Dead Sea vegetation does not exist; but the valley above is covered with grass in the rainy season, and tamarisks, acacias, oleanders, etc., abound. Cereals are raised in various parts of the territory traversed by the river, especially barley. The Jordan was first thoroughly explored by Molyneux and Lynch—by the former in 1847 in the dry season, by the latter in 1848 when the river was in flood. The climate in the Jordan valley is tropical, and it has been well described as "a tropical oasis sunk in the temperate zone." The name Jordan was regarded by the Hebrews as suggesting the "swiftly flowing" stream (from *yarad*, to descend) and hence is always used in Hebrew with the article. Consult: Molyneux, in the *Journal of the Royal Geographical Society*, vol. xviii (London, 1848); W. F. Lynch, *Official Report of the United States Expedition to Explore the Dead Sea and the River Jordan* (Baltimore, 1852); Libby and Haskins, *The Jordan Valley and Petra* (2 vols., New York, 1905); G. A. Smith, *Historical Geography of the Holy Land* (16th ed., London, 1910); and the travels in Palestine of Robinson, Porter, Tristram, Huntington, and others.

JORDAN, zhŏr'däɴ', CAMILLE (1771–1821). A French politician, born at Lyons. He became interested in public affairs at a very early age and developed into an active opponent of the French Revolution. He published, in 1792, a satire on the church of the new constitution, cleverly entitled *Histoire de la conversion d'une dame parisienne*. Proscribed by the Directory for his participation in the insurrection of Lyons, he fled to Switzerland and London. Returning to Lyons in 1796, he was chosen in 1797 to the Council of Five Hundred, where he advocated the principles of religious liberty, of which he was one of the chief supporters until his death, gaining the nickname of Jordan les Cloches (church-bell Jordan). After the revolution of the 18th Fructidor he went to Germany. In 1800 he was recalled, and opposed the measures of Bonaparte, exposing the frauds in the election of 1802 in a pamphlet, *Vrai sens du vote national sur le consulat à vie*. He lived in retirement, devoted to literature, until the accession of Louis XVIII. He was elected in 1816 to the Chamber of Deputies and sided with the opposition. His writings were published in Paris in 1818. Consult C. A. Sainte-Beuve, "Jordan et Mme. de Staël," in *Revue des Deux Mondes* (Paris, 1868).

JORDAN, jŏr'dan, CONRAD N. (1830–1903). An American banker, born in New York City. He learned the printing trade (1843), became a compositor, and in 1852 was appointed to the staff of a New York bank. From 1864 to 1880 he was cashier of another banking establishment there, and in 1880–84 was treasurer of the New York, Ontario, and Western Railway Company. In 1885 he was appointed Treasurer of the United States, from which post he resigned in 1887, upon the resignation of Daniel Manning from the secretaryship of the Treasury. During his administration he introduced a new system of public reports by means of which the precise condition of the Treasury was made readily ascertainable. He was again active in banking, as vice president of a New York banking house in 1887 and subsequently its president. From 1893 until his death he was Assistant Treasurer of the United States in New York City, in which capacity he rendered efficient service during the financial difficulties of 1893–95.

JORDAN, DAVID STARR (1851–). An American ichthyologist, educator, and writer, born at Gainesville, N. Y. He entered Cornell University at its opening session in 1868, was appointed an instructor in botany there in 1871, and a year later took the degree of M.S. In 1875 he received an M.D. from Indiana Medical College and in 1878 a Ph.D. from Butler University, where he was professor of biology from 1875 to 1879. He had already become an assistant to the United States Fish Commission and had begun under the direction of Agassiz the studies which eventually made him one of the foremost of ichthyologists. After six years as professor of zoölogy at Indiana University, he became president of that institution, serving from 1885 to 1891. His summers were spent in investigations and researches for the Fish Commission, with which his connection continued up to 1891 and from 1894 to 1909. In 1879–81 he was a special agent for the United States census and in that capacity made a report of great value on the marine industries of the Pacific coast. In 1891, on the founding of Leland Stanford Junior University, he became its president. Under his able supervision the university was successfully organized and was developed along original lines. (See LELAND STANFORD JUNIOR UNIVERSITY.) He remained president until his retirement in 1913, when he was chosen to the honorary post of chancellor. Dr. Jordan served as special United States Commissioner to investigate the fur-seal fisheries in Alaska (1897) and later to investigate salmon fisheries and in 1908–10 was international commissioner of fisheries. In 1910 he became chief director of the World Peace Foundation. He received the degree of LL.D. from several universities and in 1909 was president of the American Association for the Advancement of Science. In addition to papers in the proceedings of scientific societies, and in the reports of the United States Fish Commission and the Census Bureau, he published *A Manual of Vertebrate Animals of the Northern United States* (1876); *Science Sketches* (1887); *The Care and Culture of Men* (1896; new ed., 1910); *Fishes of North and Middle America* (4 vols., 1896–1900), with B. W. Evermann; *To Barbara* (1897), verse; *Matka and Kotik* (1897; new ed., as *The Story of Matka*, 1910); *Footnotes to Evolution* (1898); *Imperial Democracy* (1899); *Food and Game Fishes of North America* (1902), with B. W. Evermann; *Guide to the Study of Fishes* (New York, 1905); *The Human Harvest* (1907); *Fishes* (1907); *Life's Enthusiasms* (1907); *College and the Man* (1907); *The Religion of a Sensible American* (1909); *The Stability of Truth* (1909); *The Fate of Iciodoram* (1909); *War and Waste* (1913); *War's Aftermath* (1914), with H. E. Jordan.

JORDAN, DOROTHY, or DOROTHEA (1762–1816). An Irish actress. She was born near Waterford, Ireland, and was the daughter of Grace Phillips, an actress, whose husband was a reputed Captain Bland. Dorothy made her dé-

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but in Crow Street Theatre, Dublin, in 1777, as Phœbe in *As You Like It*, and, after various vicissitudes as an English provincial actress and the adoption of the name of Mrs. Dora Jordan, she appeared in 1785 at Drury Lane, London, in the character of Peggy in *The Country Girl*. She speedily won great popularity, exhibiting decided talent in comedy and musical farce. Lady Teazle, Rosalind, and Viola were her chief successes, and her acting was extravagantly praised—among others by Lamb, Leigh Hunt, Hazlitt, Byron, and Campbell. As Mrs. Ford, she was for some years the mistress of Mr., afterward Sir, Richard Ford, by whom she had four children. In 1790 her beauty captivated the Duke of Clarence, afterward William IV, and her intimacy with him lasted until 1811, when it was terminated by the Duke, an ample provision being made for her and the 10 children she had borne him. The eldest of these children, George Augustus Frederick Fitzclarence, was created Earl of Munster in 1830, and the brothers and sisters were also ennobled. In 1814 Mrs. Jordan retired to France and is said to have died of a broken heart at Saint-Cloud, July 3, 1816; but there is a suspicion that she lived for seven years afterward in England under an assumed name. A statue of her, by Chantry, was erected by William IV after his accession. Consult Boaden, *The Life of Mrs. Jordan* (London, 2 vols., 1831).

JORDAN, yôr′dȧn, Henri (1833–86). A German archæologist, born at Berlin and educated at Bonn and at Berlin, where he became instructor. From 1867 to 1886 he was professor at Königsberg. He made many journeys to Italy, his especial study being Roman religion and topography. Among his works are the excellent editions of Cato Censor and Sallust, *Catonis præter Librum de Re Rustica quæ Extant*, with elaborate *Prolegomena* (1860), and *Sallusti Catilina, Jugurtha, Historiarum Reliquiæ* (1866; 2d ed., 1876); *Topographie der Stadt Rom im Altertum* (1871–85); *Forma Urbis Romæ* (1874); *Kritische Beiträge zur Geschichte der lateinischen Sprache* (1879); *Der Tempel der Vesta und das Haus der Vestalinnen* (1886); and the third edition of Preller, *Römische Mythologie* (1881–83).

JORDAN, jôr′dan, John Woolf (1840–). An American antiquary, born in Philadelphia and educated at Nazareth Hall. He became assistant librarian of the Pennsylvania Historical Society in 1885 and in 1888 editor of the *Pennsylvania Magazine of History and Biography*. Lafayette College gave him the degree of LL.D. in 1902. His writings include: *Occupation of New York by the British* (1889); *Moravian Immigration to Pennsylvania 1734–67* (1896); *Franklin as a Genealogist* (1899); *A Century and a Half of Pittsburgh and her People* (1909), with J. N. Boucher; *A History of Delaware County, Pa., and its People* (1914).

JORDAN, Louis Henry (1855–). A British theologian and authority on comparative religion. He was born in Halifax, studied at Dalhousie University, Edinburgh, Princeton, Oxford, Marburg, Leipzig, and Berlin. He was minister of churches in Halifax (1882–85), Montreal (1885–90), and Toronto (1894–1900), and lectured on Church polity at Montreal Theological College in 1887–89 and on comparative religion at the University of Chicago (1902). After 1900 he resided largely in England, spending much time in travel and study. He wrote: *Comparative Religion: Its Genesis and Growth* (1905); *Comparative Religion: A Survey of Recent Religion* (1906, 1909, 1912); *Comparative Religion: Its Method and Scope* (1902); *Modernism in Italy* (1909); *Comparative Religion: Its Meaning and Value* (1913).

JORDAN, zhôr′däɴ′, Marie Ennemond Camille (1838–). A French mathematician, born at Lyons. He entered the Paris School of Mines in 1857 and received the degree of doctor of sciences in 1860, his theses being: (1) *Sur le nombre des valeurs des fonctions;* (2) *Sur les périodes des fonctions inverses des intégrales des différentielles algébriques* (1860). The next year he was made engineer of mines, and in 1885 he was promoted to the rank of chief engineer. After 1872 he devoted himself to the teaching of mathematics. In 1876 he was made professor of analysis at the Polytechnic School, and in 1883 he succeeded Liouville in the chair of mathematics at the Collège de France. In 1881 he was elected a member of the Academy of Sciences, in the place of Michel Chasles. One of the most noted of French mathematicians, Jordan gained a wide reputation through his discoveries in geometry and analysis. He applied himself especially to the theory of substitutions and made important applications of this theory to algebraic and linear differential equations. In France he came to be recognized as one of the greatest teachers of the *n*-dimensional geometry. The results of his investigations appeared in the form of memoirs to the number of more than 100, published chiefly in the *Journal für Mathematik*, *Annali di Matematica*, *Liouville's Journal*, *Mathematische Annalen*, *Comptes Rendus*, and the *Journal de l'Ecole Polytechnique*. Besides these contributions he published: *Théorie des substitutions et des équations algébriques* (1870), which received the Poncelet prize; *Cours d'analyse de l'Ecole Polytechnique* (3 vols., 1882–87; 3d ed., 1909).

JORDAN, yôr′dȧn, Rudolf (1810–87). A German genre painter. He was born in Berlin, studied there under Wach and afterward, at Düsseldorf, he studied under Schadow and Karl Sohn. Frequent journeys to the coasts of Holland, Belgium, and France furnished him with the subjects for the clever delineations from the life of fishermen and sailors, to which he devoted his brush almost exclusively. Of his many works, which became widely known through reproductions, the most familiar are "An Offer of Marriage in Heligoland," "Return of the Pilots" (1836), "Boat-Hawsing in Normandy" (1843), "The Pilot's Death" (1856), "Old Men's Home on the Coast of Holland" (1864), and "The Widow's Comfort" (1866), all in the National Gallery, Berlin; "Shipwreck on the Coast of Normandy" (1848), Dresden Gallery; "Soup for the Sick" and "The First Child" (1862), Düsseldorf Gallery; "First Visit after the Wedding" (1861) and "Soup-Day at a French Convent" (1868), Leipzig Museum. He did good work in water colors and was also favorably known as an illustrator and etcher. He was professor at the Düsseldorf Academy and received the great gold medal at the Berlin Exhibition in 1886.

JORDAN, jôr′dan, Thomas (1819–95). An American soldier and journalist, born in the Luray valley in Virginia. He graduated at West Point in 1840 in the same class with Sherman and Thomas, served in the Seminole and Mexican wars, and in 1861 resigned to enter the Confederate army. He commanded the forces at the first battle of Bull Run until the arrival of Beauregard, whose chief of staff he became. After Shiloh he was promoted to the rank of brigadier general (April 14, 1862) and after service with Bragg returned to Beauregard's staff and was active in the defense of Charleston. In 1869 he joined the Cuban revolutionists, was made their chief commander, and won the battle of Guaimaro, but resigned soon afterward. He edited the Memphis *Appeal* (1866–69), and wrote, with J. B. Pryor, *The Campaigns of Lieutenant-General Forrest* (1868). Upon his return to New York he became editor of the *Financial and Mining Record*. He wrote a valuable criticism of the Confederate war policy for *Harper's Magazine* (1865).

JORDAN, yôr′dȧn, Wilhelm (1819–1904). A German poet. He was born at Insterburg, East Prussia, and studied at Königsberg (1838–42) and in Berlin (1842–43). He became an exponent of liberalism and of the Young Hegelian philosophy and published two books of poems, *Irdische Phantasien* (1842) and *Schaum* (1846). Banished from Saxony by reason of his radical tendencies in politics and religion, he went to Bremen and in 1848 was elected a member of the National Assembly at Frankfort. He was subsequently secretary of the naval board in the short-lived Imperial ministry (1848) and held other offices. His best-known works are his two epics—*Demiurgos* (3 vols., 1852–54), deeply metaphysical and rather an exposition of the Young Hegelian philosophic system than a true epic, and *Nibelunge* (1867–74), in which he unsuccessfully sought to revive both the matter and manner of ancient Germanic poetry. But, as a wandering rhapsodist, Jordan recited this epic with great success in Europe and America (1871). His best work is contained in the three light dramas in verse, *Die Liebesleugner* (1855), *Tausch enttäuscht* (1856), and *Durchs Ohr* (1870). He wrote some other volumes—criticism, poetry, and prose fiction. Consult Schiffner, *Wilhelm Jordan* (Frankfort, 1889); Roepe, *Die moderne Nibelungendichtung* (1869); Von Stern, *Wilhelm Jordan* (1910).

JORDAN, William George (1864–). An American author, editor, and lecturer. He was born in New York and was educated there in the City College. At 20 he became editor of *Book Chat*. He was subsequently editor of *Current Literature;* managing editor of the *Ladies' Home Journal* (1897); editor of the *Saturday Evening Post* (1898–99); for six years editor and vice president of the Continental Publishing Co.; and for one year editor of the *Search Light*. His educational views, formulated as "Mental Training by Analysis, Law, and Analogy," he spread through lectures. It was at his suggestion (made in 1907) that the State executives organized as the House of Governors. Jordan published: *Mental Training, a Remedy for Education* (1896); *The Kingship of Self Control* (1899); *The Majesty of Calmness* (1900); *The Power of Truth* (1902); *The House of Governors* (1907); *The Crown of Individuality* (1909); *The Power of Purpose* (1910); *Little Problems of Married Life* (1910).

JORDANES, jôr-dā′nēz. A historian of the sixth century, formerly erroneously called Jornandes. He was probably an Alan and a native of Lower Mœsia. In his early years he was secretary to one of the rulers of the Alans; later he became a monk and possibly a bishop. The work by which he has become famous is his *De Rebus Geticis*, usually called *Getica*, written about the year 552, while he was living in or near Ravenna. This is very little more than a condensation of the Gothic History of Cassiodorus (q.v.). But, as the latter has been lost, the *Getica* of Jordanes is of prime importance for the early history of the Goths. Moreover, his work has preserved many German legends and is also of some importance for philologists. The second work which he wrote, a summary of Roman history, named *De Summa Temporum vel Origine Actibusque Gentis Romanæ*, usually called *Romana*, is of little value. Of the numerous editions of both works the best is by Mommsen, in the *Monumenta Germaniæ Historica, Auctores Antiquissimi*, vol. v (Berlin, 1882). Consult: Thomas Hodgkin, *Italy and her Invaders*, vol. i (Oxford, 1892); Potthast, *Bibliotheca Historica Medii Ævi* (2d ed., Berlin, 1896); Wattenbach, *Deutschlands Geschichtsquellen im Mittelalter*, vol. i (7th ed., Stuttgart, 1904).

JORDAN (jôr′dan) **RIVER**. A river of the United States which heads at the northern end of Utah Lake and flows northward in a winding course of about 40 miles to Great Salt Lake. It drains an area of north-central Utah in the extreme eastern part of the Great Basin. The main stream and its tributaries are extensively used for irrigation.

JORDA′NUS, Nemorarius, possibly identical with Jordanus de Saxonia (?–1236). A mathematician of the thirteenth century, born at Borgentreich, Diocese of Paderborn. He studied at Paris, where he gained a great reputation, and it is possible that he is the Jordanus who in 1220 was elected to succeed St. Dominic. With the exception of Leonardo of Pisa, Jordanus is the only learned man of the Latin West in the Middle Ages who deserved the name of mathematician, and his immediate influence was much greater than that of his Italian contemporary. His mathematical writings served as a basis for teaching in the various universities of the Middle Ages and Renaissance. The most important of his published writings are: *Arithmetica Demonstrata* (1496); *De Ponderibus* (1533); *Jordani Opusculum de Ponderositate* (1565); *De Numeris Datis* (published by Treutlein in the *Abhandlungen zur Geschichte der Mathematik*, 1879); *Jordani Nemorarii Geometria vel de Triangulis Libri IV* (Thorn, 1887); *Tractatus de Sphæra*.

JOREE. See Chewink.

JÖRG, yĕrk, Johann Christian Gottfried (1779–1856). A German physician, born at Predel, and educated at Leipzig, where in 1810 he was made professor of midwifery. As director of the charity hospital at Leipzig, he gained much practice in his special field. His notable contributions were the invention of mechanical aids and the introduction of a new system of Cæsarean section, gastroelytrotomy. In general he sought milder methods, both in obstetrics and orthopedy. Jörg wrote: *Handbuch der Krankheiten des Weibes* (3d ed., 1831); *Handbuch der Geburtshilfe* (3d ed., 1833); *Handbuch zum Erkennen und Heilen der Kinderkrankheiten* (2d ed., 1836); *Lehrbuch der Hebammenkunst* (5th ed., 1855).

JÖRG, Joseph Edmund (1819–1901). A Bavarian Ultramontane politician. He was born at Immenstadt; studied law, history, and theology at Munich; entered the Bureau of Archives in 1847; became in 1852 editor of the *Historischpolitische Blätter*, and in 1865 a member of the Second Bavarian Chamber. He published: *Deutschland in der Revolutionsperiode 1522–26* (1850); *Geschichte des Protestantismus in seiner neuesten Entwickelung* (1857); *Geschichte der socialpolitischen Parteien in Deutschland* (1867).

JÖRGENSEN, jĕr′gen-sen, Adolf Ditlev (1840–97). A Danish historian and archivist, born at Graasten, Sönderjylland. Of an old Danish family he felt deeply the loss to Denmark of his native province (1864). Having studied history, in 1869 he became assistant in the royal archives, and in 1889 keeper of the public records. In the latter office he rearranged with much ability all the archives of the kingdom. He published works on the earliest Danish history and Danish popular songs (1868–71), *Om Danebroges Oprindelse* (1876), *Det gamle danske Kongevaaben* (1879), *Den nordiske Kirkes Grundloggelse og förste Udvikling* (2 vols., 1874–78), *Udsigt over de danske Rigsarkivers Historie* (1884), *Kongeloven og dens Forhistorie* (1886); many biographies, notably *Peter Schumacher Griffenfeld* (2 vols., 1893–94); also *40 Fortællinger af Fædrelandets Historie* (1882; 5th ed., 1908), *Fortællinger af Nordens Historie* (2 vols., 1892–93; 2d ed., 1901), *Bidrag til Oplysning af Middelalderens Love og Samfundsforhold* (4 vols., 1872–76), and *Danmarks Riges Historie, 1814–52* (1896–97). Posthumously appeared (in three languages) the weighty treatise *Det dansk-tyske Spörgsmaal* (1900), his collected works (4 vols., 1898–1900), and his autobiography, *En Redegjörelse for min Udvikling og mit Forfatterskab* (1901).

JÖRGENSEN, Jörgen (1779–1845). A Danish adventurer, the son of a Copenhagen watchmaker. In 1809 he audaciously seized upon the government of Iceland, looted the treasury, and with an "army of eight men" ruled the island for six weeks, until driven out by the captain of an English sloop of war. He went to England, was tried and found guilty on a charge of robbery, and was sent to Botany Bay, where he died. For his adventure he became known as the Hundadagarkonungur, i.e., the Dog-Days King. Consult J. F. Hogan, *The Convict King* (London, 1891; Dan. trans. by U. von Ripperda, Copenhagen, 1892).

JÖRGENSEN, jĕr′gen-sen, Sophus Mads (1837–1914). A Danish chemist and author, born at Slagelse and educated at the University of Copenhagen. In 1867 he was made director of the chemical laboratory of the Polytechnic College in Copenhagen, in 1871 lecturer in chemistry in the university there, and from 1887 to 1908 was professor. As teacher and scientist, he did much important work, his advice being much sought by scientific associations and practical enterprises. He wrote 1900 pages of the celebrated Gmelin-Kraut *Handbuch der Chemie; Overjodider af Alkaloiderne* (1869); and widely used textbooks, such as *Lærebog i kvantitativ uorganisk Analyse* (1869), *Lærebog i organisk Kemi* (1880), and *Kemiens Grundbegreber* (1902), besides numerous articles in scientific periodicals. In 1906 he was awarded the Lavoisier gold medal and the Berthelot bronze medal by the Académie des Sciences, Paris.

JORIS, yŏ′rĭs, or **JORISZOON,** yŏ′rĭs-zōn, David (c.1501–56). An Anabaptist leader, whose real name was Hans Jorisz, born either at Ghent or Bruges. He was apprenticed to a glass painter and soon displayed great aptitude in the work. To perfect himself in the art, he visited Belgium, France, and England. Returning to Holland, he settled at Delft, practicing his trade (1524); but in 1528 he began to display unusual religious zeal against Roman Catholicism, and, while a procession on Ascension Day was passing in Delft, he stopped the priests, accused them of deceiving the people by false teachings, and reproached them for worshiping images and pictures. He was arrested and banished for three years. Abandoning the common principles of the Reformation, he became an adherent of Anabaptist views. At first he did not identify himself with the sect on account of their disorderly conduct and their doctrine of using the sword to establish their authority; but in 1534 he fully joined them by rebaptism. He was consecrated as Bishop of Delft by Dammas, Ubbo, and others. His influence was very great and his followers numerous. The Anabaptist leaders, jealous of his success, openly disavowed him. But at the convocation of Anabaptists in 1536 Joris fearlessly declared himself a divinely appointed leader and soon afterward issued a pamphlet calling all parties to a peaceful union. The leaders were still more provoked, and most of the Anabaptists forsook him. Those who adhered to him took the name of Jorists or Davidists. He professed to have visions and revelations and interpreted the persecutions to which his followers were subjected as proofs of the divine favor. At Delft, Haarlem, Amsterdam, Rotterdam, Leyden, and other cities, many suffered death for their adherence to him. His own mother died on the scaffold, a martyr to the doctrines which her son was propagating (February, 1538). He kept up his wandering life till 1544, when, the voluntary gifts of his followers rendering him independent, he altered his life completely. In Basel in August of that year appeared a man by the name of John of Bruges. He was wealthy, a communicant in the Reformed church, and had come there with his family. He was highly esteemed for his wealth and his virtues and died peacefully, Aug. 25, 1556. This was David Joris. For three years his secret was kept. Then his son-in-law, Nicholas Blesdyk—a reformed preacher, but an avaricious and unprincipled man, who had been his disciple—revealed the identity of John of Bruges with David Joris. The clergy and university declared his opinions heretical, and his body was dug up and burned. The sect, which Joris had secretly communicated with while living in Basel, survived his death half a century and circulated his writings. Joris was a thorough mystic and believed that he had divine visions. He rejected the doctrine of the Trinity and held strange views concerning Christ. He believed that he was to establish internally and externally the eternal kingdom of Christ, which before was the kingdom of Christ only internally. He denied the doctrine of future judgment and the existence of angels. He held that the body only was defiled by sin. Of his 250 books and 1000 letters, the most important is the *Book of Miracles*, under the title of *Wonderboeck*, two editions of which were printed (1542, 1551), both anonymous. In it he adopts the idea of Joachim of Floris (q.v.), of three dispensations. Consult, for a complete account of his life and works, Nippold's articles in *Zeitschrift für die historische Theologie* (Leipzig, 1863, 1864, 1868); for a bibliography of his writings, Van der Linde, *David Joris: Bibliographie* (The Hague, 1867). See Davidists.

JORIS, yō′rēs, Pio (1843–). An Italian genre and landscape painter, born in Rome, where he studied at St. Luke's Academy from 1856 to 1864, and later under Fortuny, to whose influence he owes much. He traveled extensively in Germany, France, England, and Spain, and depicts life and nature with felicity of conception and coloristic splendor. Notable specimens of his art are: "Sunday Morning before the Porta del Popolo in Rome" (1869); "Baptism in Ischia" (1878); "Flight of Pope Eugene IV" (1883), in the National Gallery, Rome; and "Church Festival in St. Peter's" (1901). He also achieved distinction as a painter of water colors, being made president of the Società d' Acquarellisti in Rome and honorary member of the Société Belge des Aquarellistes.

JORISTS, jō′rĭsts. See Davidists.

JORISZOON, David. See Joris, David.

JOR′KINS. In Dickens's *David Copperfield,* the soft-hearted partner of Mr. Spenlow. The latter, in his intercourse with clients, paints Jorkins as a rigid taskmaster and so throws the responsibility for the firm's acts on him.

JÖRN, yẽrn, Karl (1876–). A Russian tenor, born at Riga. When he was about 18 years of age, Otto Lohse (q.v.), at that time the conductor of the Riga Opera, discovered his voice and induced him to study with Schutte-Harmsen, a baritone at the opera. After one year of study he went to Berlin to Ress. In 1895 he made his début at Freiburg, which resulted in an engagement at Zurich. Here Ludwig Barnay (q.v.) was greatly impressed by him and in 1899 secured him a contract with the Hamburg Opera, where he laid the foundation of his fame. In 1902–03 he was connected with the Berlin Royal Opera, but with generous leave for extended guest tours, which took him all over Europe and to South America. In 1908 he joined the Metropolitan Opera, where in his first season he established himself as a prime favorite. His repertory includes 100 operas in German, Italian, French, English, Russian, Spanish, and Portuguese.

JORNANDES. See Jordanes.

JOR′TIN, John (1698–1770). A Church of England prelate. He was born in London, Oct. 23, 1698. His father was a French Protestant of Brittany who had come to England on the revocation of the Edict of Nantes. The son was educated at Charterhouse and at Jesus College, Cambridge, taking his first degree in 1719; soon became a fellow of the college; and graduated as M.A. in 1722. While at Cambridge, he published a small volume of Latin poems, entitled *Lusus Poetici,* regarded as worthy of a high place among modern Latin verses. He was presented with a living in Cambridgeshire (1727), but removed to London (1730), where he became an admired preacher. He was rector of Eastwell in Kent (1737) and St. Dunstan's-in-the-East (1751); became in 1762 the domestic chaplain of the Bishop of London, rector of Kensington, London, and prebend in the cathedral of St. Paul's. In 1764 he was made Archdeacon of London. He died Sept. 5, 1770. His most important works were: *Remarks on Ecclesiastical History* (1751–54; new ed. by Trollope, 1846); *Life of Erasmus* (1758–60; new ed. 1808); *Tracts, Philological, Critical, and Miscellaneous* (1790). He wrote also criticisms on Spenser, Milton, Tillotson, Cardinal Pole, Seneca, and others. His *Various Works* appeared in 1805–10, and his *Memoirs,* by Disney, in 1792. Consult his *Life,* by Trollope (London, 1846).

JORULLO, hō-rōō′lyō. A volcanic mountain in the State of Michoacan, Mexico, situated 70 miles southwest of Morelia, the capital of the state. It is of comparatively recent origin, having risen from the surrounding plain as a result of the earthquake of Sept. 29, 1759. Besides Jorullo, there sprang up five other volcanic cones and a large number of small cones, which were still active at the time of the visit of Humboldt in 1803. The surrounding region is covered with lava fields and scattered volcanic rocks, showing evidence of the extent of the eruption, and near the cone are a number of hot springs. The height of Jorullo above the sea is 4265 feet; it is now inactive.

JOSAPHAT. See Barlaam and Josaphat.

JOSÉ, hō-sā′, Poema de (Sp., Poem of Joseph). A Spanish poem belonging to the class of documents called *aljamiados,* i.e., works written in the Spanish language, but with Arabic characters. Through a hieratical impulse, or merely as a result of a rooted attachment to the alphabetical signs of their ancestral speech, certain of the Moors, when composing in Spanish, adapted the Arabic signs to the purpose and avoided the use of the Roman characters. The *José* is the most interesting work of the kind. It seems to have been written in the sixteenth century and possibly on Aragonese territory if we may judge by some dialect forms found in it. It tells the story of the selling of Joseph by his brethren and of his life in Egypt, intermingling with the narrative elements of Mohammedan tradition. In form it is modeled upon the old Spanish poems which were written in what Gonzalo de Berceo called the *Cuaderna Vía,* i.e., it is in quatrains of 12-syllabled or 14-syllabled lines, with a single rhyme in the quatrain. From the phonetic point of view this work, like others of its kind, has a certain value, since the adaptation of the Arabic alphabet to Spanish sounds affords a possible clew to the real nature of those sounds at the time in question. Consult: Morf's ed. of the *José* (Leipzig, 1883); *Biblioteca de autores españoles,* vol. lvii (Madrid, 1864); F. G. Robles, *Leyendas de José, Hijo de Jacob y de Alejandro Magno* (Saragossa, 1888); Ford, "The Old Spanish Sibilants," in *Harvard University Studies and Notes in Philology and Literature* (Boston, 1900); M. Schmitz, "Ueber das altspanische Poema de José," in *Romanische Forschungen,* vol. xi (Erlangen, 1901); Grünbaum, *Gesammelte Aufsätze zur Sprach- und Sagenkunde* (Berlin, 1901); Menéndez Pidal, *Poema de Yúçuf* (Madrid, 1902); Saroïhandy, "Remarques sur le poème de Yúçuf," in *Bulletin hispanique,* vol. vi (Paris, 1904).

JOSEF′FY, yō-zĕf′ĭ, Rafael (1852–). An Hungarian-American pianist, composer, and teacher, born at Miskolcz, Hungary. He was educated mainly under Moscheles at the Leipzig Conservatory, but studied subsequently under Tausig at Berlin. About 1880 he established himself in New York and afterward came to be recognized as one of the leading teachers and concert virtuosos in his adopted country. Before coming to America he had won for himself a high reputation as an interpreter of Chopin and, after some very successful concert tours throughout Germany and Austria, had made a place for himself in the musical life of Vienna, in which city he had taken up his residence. He published upward of a score of piano compositions, which are marked by delicacy and charm of musical phrasing. From 1885 to 1906 Joseffy was a member of the faculty of the National Conservatory of Music, New York. His playing has been characterized as possessing great delicacy, charm of touch, facility of execution, and exquisite finish. He is the author of an excellent *School of Advanced Piano Playing* (1892; also in German).

JO'SEPH (Heb. *Yôsēph*, he increases; perhaps an abbreviation of *Yôsēph 'El*, God increases). The son of Jacob and Rachel (Gen. xxx. 22-24), eponym of the tribe of Joseph. The story of Joseph is given with much detail in the last 14 chapters of the Book of Genesis. He is represented as the favored son of his father; for this reason and because of his own boyish arrogance in consequence of it, he gains the ill will of his brethren. Taking advantage of a favorable opportunity, they decide to kill him, but ultimately think better of their purpose and sell him into slavery instead. He is taken to Egypt and becomes the slave of Potiphar, an officer of Pharaoh. Resisting the advances of Potiphar's wife, he gains her enmity and is put in prison on a false accusation by her. His skill in interpreting dreams secures his release and brings him into favor with Pharaoh. He saves Egypt in a time of famine and becomes the highest official in the land. He marries the daughter of the high priest of Heliopolis. Through his wise administration he not only maintains the people of Egypt alive, but also secures for the crown possession of the soil and 20 per cent of all income from the land, and for the priesthood exemption from taxation. The famine extends to Palestine, and Joseph's brethren come to Egypt for provisions. A reconciliation follows, and Jacob and all his family remove to Egypt and take up their residence in the land of Goshen.

Many modern scholars think that the story of Joseph, like those of Abraham, Isaac, and Jacob, is a combination of two sources, the Yahwistic and Elohistic narratives. (See PENTATEUCH.) The combination represents, in their judgment, the welding together of a much larger number of elements than in any of the other narratives in Genesis. In the minds of both writers Joseph is supposed to be the representative of the Northern Kingdom of Israel, and the importance assigned to him is taken to indicate a northern origin of these stories. It is held, however, that this is particularly evident in those portions of the composite narrative which belong to E (a northern writer), and that, while J (a Judæan writer) also must admit the superiority to be accorded to Joseph over other tribes represented as his brethren, he saves his national pride by according to his own tribe as favorable a position as possible by the side of Joseph, by maintaining that it was Judah who proposed to save Joseph from the jealousy of his brothers, whereas according to the northern writer it was Reuben who intervened. But other scholars consider this conjectural division of the story into Yahwistic and Elohistic elements as unproved and improbable. In view of the uncertainty as to the use of the divine names in the original text, indicated by manuscripts and versions, they attach little importance to the sporadic use in two chapters of the name Yahwe. They find no difficulty in assuming more than one cause for the jealousy of the brethren or in supposing that two brothers were thought to be more friendly than the rest. Since both of these brothers speak of the Ishmaelites, and the Greek version suggests that the "Midianites" is a corruption of the "Ishmaelites," they find no contradiction in this respect. The keeper of the harem was often a married man in ancient Egypt, and with his office that of chief executioner is naturally connected; the term *saris* seems to designate not only an "eunuch," but also such an official as elsewhere was frequently an actual eunuch.

Various elements are distinguished in the story of Joseph: (1) northern traditions, reflecting the rivalry between various tribes which (or some of which) formed parts of the later Hebrew confederation; (2) recollections of the sojourn of certain Hebrew clans in the land of Goshen (q.v.), subsequently enlarged into the tradition which brought all the 12 clans into Egypt; (3) an Egyptian folk tale of a faithful servant wrongfully accused by his master; (4) a story of a Hebrew who rose to a high official position in Egypt; and (5) certain peculiarities of Egyptian life, such as the heavy taxation and the exemption of the priests, for which an explanation was sought. Approaching the story of Joseph from this point of view, its component parts become tolerably clear. Joseph is the favorite son of Jacob, the eldest son of the patriarch's favorite wife, Rachel. He belongs to Shechem (the chief sanctuary in the Northern Kingdom) in the same sense in which Jacob belongs to Bethel, Isaac to Beersheba, and Abraham to Hebron. He rouses the jealousy of his brothers because of a garment with sleeves (befitting one of superior rank) given to him by Jacob; and because of his dreams, which betokened future greatness and superiority over his brothers. The result is that the brothers decide to kill him, but are persuaded by Reuben and by Judah to spare his life. He is cast into a cistern and is sold by his brothers to Ishmaelites and in this way is carried down to Egypt. In this incident two factors are distinguished: (*a*) the story of Joseph's superiority, and (*b*) the story of his humiliation by his brothers. The former reflects the natural pride of the northern writer, the latter embraces a recollection of a combination of a number of tribes against one which had become too powerful. In actual Hebrew history there is no tribe of Joseph, but instead we have two clans, Ephraim and Manasseh (qq.v.), who are the main props of the Northern Kingdom and who are represented in tradition as the sons of Joseph. It would seem, therefore, that a Joseph tribe, after being large enough to produce two offshoots, aroused such opposition and fear because of growing power as to lead to a combination which succeeded in driving this dangerous tribe from its territory. Such an event is just what we encounter among Arabic clans. The story of Joseph in Egypt contains, again, two elements: (*a*) tradition of the sojourn of some of the Hebrew tribes in Goshen (q.v.), combined with (*b*) two stories that have nothing to do with the Hebrews. That some of the tribes afterward forming part of the confederation of the Bene Israel came at one time to the land of Goshen adjoining Egypt proper on the northeast and counted as belonging to Egyptian territory, in connection either with the Hyksos invasion or in connection with that steady process leading Semitic nomads to make more or less permanent settlements on the frontier districts of Egypt, is hardly open to doubt, as, on the other hand, it is equally certain that not all of the tribes came into this region. The pragmatic method of history writing which prevails in Genesis (as in the whole Pentateuch) represents the Bene Israel as forming a unit from time immemorial, and hence the popular tradition is so modified as to bring all the Hebrew tribes into Egypt and to bring them out again in a body under the leadership of Moses. Joseph may have been the name of the tribe (and possibly also of its numen) which first pushed its way into the western part of Goshen (q.v.). Of the two Egyptian stories told of Joseph, one is a folk tale, probably of Egyptian origin; the other embodies a reminiscence based upon an actual occurrence. The folk tale is that of a faithful servant intrusted by his master with the care of his household, and who resists the temptations offered by the faithless wife of the master. The servant is wrongfully accused and thrown into prison. The sequel of the story in its original form no doubt told of the proof that was forthcoming, establishing the innocence of the servant, his reward for his fidelity and honesty, and the punishment of the bad wife. This story, the Egyptian parallel to which exists in the so-called *Tale of Two Brothers* (consult Petrie, *Egyptian Tales*, London, 1895–99; Ranke, in Gressmann, *Altorientalische Texte und Bilder*, pp. 223 ff., Tübingen, 1909), is attached to Joseph as a favorite character of northern Hebrew legend. It is a species of Midrash very much of the order of the stories found in the Jewish Midrashim to illustrate Abraham's piety or Moses' faith. Instead, however, of presenting the story with its original sequel, it is attached to another tale about a foreigner who rose to a position of great eminence at the Egyptian court, and who manifested his wisdom and devotion to the interest of his royal master in various ways. The period to which this incident belongs can no longer be determined. From the Tell el-Amarna tablets we learn that in the fifteenth century B.C. it was not uncommon for Semites to hold high positions in Egyptian domains; and it has therefore been supposed that at the period of Egyptian supremacy over Palestine, when the relations between Egyptians and Semites were naturally quite close, a Hebrew vizier lived, the memory of whose remarkable career was thus preserved. It should be borne in mind, however, that there is as yet no positive evidence of such a person. This story, too, is then supposed to have been attached to Joseph as a familiar subject of legend and an appropriate personage of whom it could be told, and, having been combined with the folklore tale, to have become another incident in the life of one and the same person.

The visit of Joseph's brothers, with its dramatic incidents, and the emigration of Jacob and his sons and their families into Egypt, may be due to the pragmatic historical scheme of the Old Testament writers; while the meeting between Jacob and Joseph, and Jacob's interview with Pharaoh, from this point of view, are another specimen of early Jewish Midrash. There remains the scene at the death of Jacob (xlviii. 15–20) when Joseph brings his two sons to his father, who in blessing them gives Ephraim, although the younger, the preference over Manasseh. This touch is due to the pride of the Ephraimitic writer, who in this way justifies the greater prominence which, as a matter of fact, the tribe of Ephraim obtained. Joseph dies in Egypt, which may be taken perhaps as another indication that the tribe actually never left Egypt, or the land of Goshen, which was counted as a part of the territory of Egypt. The name of Joseph, however, survives largely through the northern clans, Ephraim and Manasseh, and in the local legendary tales gradually assumes almost the same position as Israel until, with the prophets, "house of Joseph" becomes synonymous with the "house of Israel," and the terms "house of Joseph" and "house of Jacob" embrace the Hebrews as a body. For the results of critical investigation regarding Joseph, consult the commentaries on Genesis of Dillmann, Holzinger, Gunkel (3d ed., 1910), Driver, and Skinner, and the Hebrew histories of Stade, Guthe, Piepenbring, Kent, Kittel, and Wellhausen (7th ed., Berlin, 1914).

JOSEPH. Husband of Mary, and the reputed father of Jesus (Luke iii. 23, iv. 22; John i. 45, vi. 42). He was probably a carpenter (Matt. xiii. 55), although Matthew's designation of Jesus as "the son of the carpenter" may mean no more than that he was a "carpenter," as he is termed in Mark vi. 3. Joseph is not alluded to in the New Testament outside of the Gospels of Matthew, Luke, and John. The earliest Gospel (Mark) is silent about him. The chief sources of information (apart from the Apocryphal Gospels) are the two narratives of the infancy of Jesus, prefixed respectively to the first and third Gospel. In addition to the well-known material there preserved, Luke alone records that "Joseph and his mother" brought the child Jesus to Jerusalem to present him to the Lord, in accordance with the Law of Moses (ii. 22, 23); and that, when Jesus was a boy of 12, his parents following their annual custom, went with him to the Passover feast in Jerusalem (ii. 41). From this point on, Joseph passes out of the clear light of history. That he died before the public ministry of Jesus began is only an inference, though a strongly justified one, from Mark iii. 20 with 31, vi. 3; John xix. 26, 27.

JOSEPH. 1. An oratorio by Handel (q.v.), first produced in London, March 2, 1744. 2. An opera by Méhul (q.v.), first produced in Paris, Feb. 17, 1807.

JOSEPH THE CARPENTER, HISTORY OF. See APOCRYPHA, *New Testament*.

JOSEPH (*Ger. pron.* yō′zĕf) I (1678–1711). Holy Roman Emperor from 1705 to 1711. He was the eldest son of Emperor Leopold I and was born at Vienna, July 26, 1678. He was crowned King of Hungary in 1687 and King of the Romans in 1690. He succeeded his father as Emperor and ruler of the Hapsburg dominions on May 5, 1705. His accession infused new energy into the prosecution of the war against France, which on the part of the Imperialists had been carried on with some dilatoriness. (See SUCCESSION WARS, *War of the Spanish Succession*.) His ambition was directed towards the extension of the Austrian power in Italy and Bavaria; of the latter the victories of Marlborough and Eugene made him the master, but his plan to bring the Electorate of Bavaria under the Austrian crown failed on account of the opposition of the other German sovereigns. He was engaged in a long war with his Hungarian subjects, led by Rákóczy, which was terminated immediately after the death of the Emperor. Joseph was powerful enough to impose his will upon the Pope, whom he forced in 1709 to acknowledge his brother Charles as King of Spain. The influence of the Prince of Salm, who had the charge of his education, and his subsequent connection with Prince Eugene, led Joseph to embrace opinions much more liberal than those which had generally prevailed in his family, and he granted privileges to the Protestants of Hungary and Bohemia which had been refused by his predecessors. He also concluded a treaty in 1706 with Charles XII of Sweden, by which he granted religious liberty to the Protestants of Silesia and restored to them over 200 churches which had been taken from them by the Jesuits. He was fond of courtly ceremonial, but in his personal relation was mild and affable. He sought to improve the condition of the peasantry in his dominions by relieving them from some of their feudal burdens. Consult Herchenhahn, *Geschichte der Regierung Kaiser Josephs I.* (2 vols., Leipzig, 1786–89), and Robinson and Beard, *Development of Modern Europe*, vol. i (Boston, 1907).

JOSEPH II (1741–90). Holy Roman Emperor from 1765 to 1790. He was the son of the Emperor Francis I, of the house of Lorraine, and Maria Theresa, sovereign of the Austrian dominions and Queen of Hungary, and was born at Vienna, March 13, 1741, at a time when his mother's fortunes were in their lowest state of depression. He early gave proof of excellent abilities. He was elected King of the Romans in 1764, and Maria Theresa associated him with herself in the government of the Austrian states; but for some time his actual share in it amounted to little more than the chief command of the army. In 1765 he succeeded his father as Holy Roman Emperor. On the death of Maria Theresa, in 1780, he inherited all her dignities and power. Joseph II was a zealous reformer, having imbibed, like Frederick the Great, the principles of philosophy which prevailed in that age; but he worked unwisely, depending too much upon the exercise of authority and having too much faith in the intelligence of the average man in his day. Deeply concerned for the welfare of his subjects, the Emperor set to work to abolish privilege and oppression throughout his dominions. He was the typical "benevolent despot" of the age, and he sought to impose his reforms by force of his autocratic will, without considering the expediency of many of his radical measures and in total disregard of the sentiments of those whom supposedly his reforms were to benefit. As it was, he succeeded for the greater part in antagonizing his subjects in Hungary, in Bohemia, and in the Netherlands, and was compelled repeatedly to revoke many of his important measures of reform. Not the least of his blunders was his attempt to merge the heterogeneous nationalities of his realms into a centralized state. Nevertheless he contributed immensely to the permanent improvement of the administration and the system of taxation and did much to develop commerce and industry. His liberal views in matters ecclesiastical aroused the bitter hostility of the clergy. As soon as he found himself in full possession of the government of Austria, he proceeded to declare himself independent of the Pope and to prohibit the publication of any new papal bulls in his dominions without his *placet regium*. The further publication of the bulls *Unigenitus* and *In Cœna Domini* was also prohibited. Besides this he suppressed no fewer than 700 convents, reduced the number of the regular clergy from 63,000 to 27,000, prohibited papal dispensations as to marriage, and on Oct. 13, 1781, published the celebrated Edict of Toleration, by which he allowed the free exercise of their religion to the Protestants and the adherents of the Greek faith in his dominions. Pope Pius VI thought to change this policy by a personal interview with the Emperor, and for that purpose made a visit to Vienna in 1782; but, although he was quite unsuccessful in his object, he carried away with him the conviction that the people were utterly unprepared for the reforms which their sovereign sought to accomplish. Many of the reforms instituted by this enlightened monarch were later undone. In 1788–89 Joseph II, in alliance with Russia, engaged in a war with Turkey, in which he was unsuccessful; the vexation caused by this and by the revolt in the Netherlands (1789–90), occasioned by the abolition of the ancient constitution of Brabant, hastened his death, which took place Feb. 20, 1790. Joseph II had the ideals and the will, but he lacked the temperament, of a constructive reformer. He believed that despotic authority was all-sufficient to make any desirable change and so failed to see that democracy was necessary in order to give stability and permanence to reforms. Consult: Gross-Hoffinger, *Lebens- und Regierungsgeschichte Josephs II.* (4 vols., Stuttgart, 1835–37); T. Juste, *Histoire du règne de l'empereur Joseph II et de la révolution belge de 1790* (2 vols., Brussels, 1845–46); Arneth, *Joseph II. und Leopold von Toscana: ihr Briefwechsel, 1781–90* (Vienna, 1870); Brunner, *Joseph II.* (Freiburg, 1885); Schlitter, *Pius VI. und Joseph II.* (Vienna, 1894); Robinson and Beard, *Development of Modern Europe*, vol. i (Boston, 1907).

JOSEPH, AARON BEN. See AARON BEN JOSEPH.

JOSEPH, FATHER. A popular name for François Leclerc du Tremblay (1577–1638), the private secretary and confidant of Cardinal Richelieu. He was born in Paris of a distinguished family and was originally a soldier, but left the army in 1599 and became a Capuchin friar. After some time Father Joseph, as he was called, attracted the attention of Richelieu and in 1611 became his secretary. He was intrusted by Richelieu with the management of his secret diplomacy and was frequently sent on important missions abroad. So great was his influence with the Cardinal and so well recognized his power that he was known by the sobriquet of His Gray Eminence, in contradistinction to the title of Cardinal Richelieu. (See EMINENCE GRISE; EMINENCE ROUGE.) Religious zeal actuated his entire official life, and the conversion and dissemination of the principles of the Church were the objects most dear to him. In pursuance of these objects he lent his aid to the forcible conversion of French Protestants and also sent missionaries to India and Canada, while he earnestly advocated a crusade against the Turks. A priest of ascetic habits, but of fiery enthusiasm, he was also a statesman of broad views and comprehensive knowledge, and one of the shrewdest and most able diplomats of his time. His death took place at Ruel, Dec. 18, 1638. A series of memoirs of his time of which he is the author is deposited in the Bibliothèque Nationale in Paris, but the volumes have never been published, though supposed to contain important matter for the history of Louis XIII's reign. He was also the author of *Le Turciad*, a Latin poem, and of several political and religious tracts. Consult: Richard, *Vie du père Joseph* (Paris, 1702); Fagniez, *Le père Joseph et Richelieu, 1597–1638* (ib., 1894); R. F. O'Connor, *His Grey Eminence, the True Friar Joseph of Bulwer Lytton's "Richelieu": An Historical Study* (Philadelphia, 1912).

JOSEPH, Prayer of. An apocryphal work belonging to the Old Testament Pseudepigrapha, now known only from old lists of apocryphal books and some quotations in Origen, who seems to have esteemed it highly. The work was of Jewish origin. Why it was called the Prayer of Joseph is uncertain, since in Origen's quotations Jacob, not Joseph, is the speaker. It was apparently of pseudoprophetic or apocalyptic character, dealing largely with matters concerning angels and their respective ranks and the secrets of the future. Since Jacob speaks of himself as the first born of all living creatures, some have supposed that the book originated in the desire to counteract the claims of Christians in reference to Jesus, by representing the patriarchs as of equal honor and rank. Consult Emil Schürer, *History of the Jewish People in the Time of Jesus Christ*, vol. ii (New York, 1896).

JOSEPH AN'DREWS. A novel by Henry Fielding (1742). Begun as a satire on Richardson's *Pamela*, whose brother the hero is, it turned out an excellent story.

JOSEPH BAR'SABBAS. The unsuccessful candidate for the place among the Twelve made vacant by the death of Judas Iscariot. He is mentioned in the New Testament only in Acts i. 23. His Roman name, Justus, is clear; but his Jewish name, Barsabbas, perhaps son of Sheba or son of the Sabbath, is of doubtful etymology. Beyond the fact that he must have been a disciple of Jesus from the Baptism to the Ascension, in order to be eligible to a place among the Twelve (Acts i. 21–22), we know nothing. A later but untrustworthy tradition makes him one of the Seventy or Seventy-two (Luke x. 1).

JOSEPH FRIEDRICH WILHELM, yō'zĕf frē'drĭk vĭl'hĕlm, Prince of Saxe-Hildburghausen (1702–87). An Austrian general. He entered the service in 1719, became a colonel in 1732, and fought bravely in Italy and on the Rhine (1734–35). In 1736 he put down an insurrection of the Croats, and he served against the Turks as master general of the ordnance until 1739. During the War of the Austrian Succession (1740–48) he had charge of the defensive forces in the interior of the Empire. In 1757 he was put in command to act with the French under Soubise, was defeated at Rossbach, and retired from the service.

JOSEPHI, jō-zĕf'ĭ, Isaac A. (1859–). An American miniature painter. He was born in New York and studied at the Art Students' League, and under Bonnât in Paris. An ex-president of the American Society of Miniature Painters and a member of the Royal Society of Miniature Painters, London, he exhibited frequently in America and abroad and received honorable mention in Paris in 1900 and a medal at Charleston in 1902.

JOSEPHINE, zhō'zā'fēn' (Fr. *Joséphine*), Marie Rose Tascher de la Pagerie (1763–1814). First wife of Napoleon Bonaparte and first Empress of France. Josephine was born of a Creole family on the island of Martinique, June 23, 1763. Poorly educated, though carefully trained in the social formalities of the period, she was taken to France (Dec. 13, 1779) at the age of 16 to be married under the auspices of her aunt, Madame de Renaudin, to Alexandre, Vicomte de Beauharnais, also of a Martinique family. Of this union, which soon proved unhappy, were born two children—on Sept. 3, 1780, a son who became later, by the favor of Napoleon, Prince Eugene, Viceroy of Italy, and on April 10, 1783, a daughter, Hortense, who later was married to Napoleon's brother Louis and became Queen of Holland and mother of Napoleon III. Beauharnais played a considerable rôle in the political and military circles of the early period of the French Revolution. Assisted by the popularity of the salôn of Josephine, he became commander of the Army of the Rhine in 1793. Both fell under suspicion, however, in 1794 during the Terror, and Josephine barely escaped through the efforts of Madame Tallien, while her husband was executed. Left a widow, apparently with considerable means, Josephine became conspicuous in the society of the salôns, which included also such well-known figures as Madame Récamier and Madame Tallien, and enjoyed the special protection of Barras—for personal reasons, it has been alleged. Somewhat reluctantly she was induced to marry (March 9, 1796) the rising young commander Bonaparte, who was placed through the influence of Barras in command of the Italian campaign of 1796. Josephine accompanied him during part of his victorious campaign. During the Egyptian campaign, however, she remained in Paris and conducted herself in such a way that Napoleon on his return is said to have threatened a separation. During the four years of the Consulate Josephine reigned as queen of society and was able to add to the social prestige of Napoleon's position, though his numerous infidelities were a source of chagrin and apprehension. Josephine was crowned Empress beside Napoleon in Notre Dame on December 2 and remarried to him with a religious ceremony. (See Plate of David.) Her son was soon after made Viceroy of Italy and married the daughter of the King of Bavaria, while her daughter, Hortense, who had been married to Louis Bonaparte in 1802, became Queen of Holland in 1806. The childless union of Napoleon and Josephine was becoming increasingly unsatisfactory to Napoleon as his ideas of founding a dynasty developed, and in 1809, after his successful Austrian campaign, he definitely decided upon a divorce, to which Josephine was induced to give her mournful compliance. On the following day the Senate sanctioned the divorce and bestowed upon Josephine Imperial honors and a large annuity. She retired to Malmaison, where she led a lonely and unhappy life. Napoleon paid her frequent friendly visits and after his marriage with the Archduchess Marie-Louise brought his son, the small King of Rome, to see her. She died at Malmaison, May 29, 1814.

Her character resembled that of other women of her time who had had the same education and environment. Frivolous and extravagant and of mediocre intelligence, she was also kind and affectionate, and her charm of manner, which combined the dignity of the old régime with the ease of the new, fitted her to reign in the society of the Empire.

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JOSEPH OF AR'IMATHÆ'A. The disciple of Jesus who provided for His burial. Arimathæa was probably the village of Ramah, or Ramathaim-zophim, of the hill country of Ephraim, the birthplace of Samuel (1 Sam. i. 1 with 19), a few miles north of Jerusalem, near Lydda (cf. 1 Macc. xi. 34). Joseph is mentioned in the New Testament only in connection with the entombment of Jesus (Mark xv. 43–46; Matt. xxvii. 57–60; Luke xxiii. 50–53; John xix. 38–42). The four Evangelists record in general agreement that Joseph came to Pilate and asked for the body of Jesus, and that the body, after a hasty preparation for burial, was placed in a new tomb. Mark calls Joseph a "councilor of honorable estate," which doubtless implies that he was a wealthy man of the better class and a member of the Council, or Sanhedrin; suggests his courage in making the daring request of the Procurator; and states that he was "looking for the kingdom of God," i.e., that he was one of the "pious" like Simeon (Luke ii. 25), who hoped for a coming of the Messiah which would be a religious blessing to the people of God. Matthew does not call him a councilor, but designates him as a "rich man" and a "disciple" of Jesus. Luke also calls him a "councilor" and a "good and righteous man" and states specifically that he had not assented to the action of the Sanhedrin in its condemnation of Jesus. John qualifies Matthew's remark about discipleship by observing that he was a disciple in secret only, for fear of the Jews, and then adds significantly that it was Nicodemus who brought the myrrh and aloes, and that he assisted Joseph in the preparations for the entombment. These differences in the accounts have been thought to indicate that John combines two originally different traditions—one that Jesus was buried by Joseph, a man of noble rank, wealthy, and the owner of a tomb near Jerusalem; the other that it was Nicodemus, a well-known Pharisee, friendly, however, to Jesus, a member of the Sanhedrin, who buried him. The differences, however, do not definitely prove the hypothesis. According to tradition, which is of no historical worth, Joseph went as missionary to Gaul and Britain and built the first Christian oratory in the latter country on the site of Glastonbury.

JOSE'PHUS, Flavius (37–?). A celebrated Jewish historian. He was born at Jerusalem in the year 37 A.D., of both royal and sacerdotal lineage, being descended, on the mother's side, from the line of Hasmonæan princes, while his father, Matthias, officiated as a priest in the first of the 24 courses. He received a good education and became familiar with both Hebrew and Greek literature. Having attended the lectures of the paramount religious schools of his time—"sects," as he terms them—he withdrew into the desert, to a man whom he calls Banos, probably an Essene. Three years later he returned to Jerusalem and henceforth belonged to the Pharisees. At the age of 26 he was chosen delegate to Nero. At the outbreak of the great war between the Jews and Romans, Josephus was appointed Governor of Galilee. Here he displayed valor and prudence; but the advance of the Roman general Vespasian (67) made resistance hopeless. The city of Jotapata, into which Josephus had thrown himself, was taken after a desperate resistance of 47 days. Along with some others he concealed himself in a cavern; but his hiding place was discovered, and, being brought before Vespasian, he would have been sent to Nero, had he not—according to his own account, for Josephus is his own and his sole biographer—prophesied that his captor would yet become Emperor of Rome. Nevertheless, he was kept in a sort of easy imprisonment for about three years. It was then that he adopted the Latinized name by which he is known. Josephus was present in the Roman army at the siege of Jerusalem by Titus and after the fall of the city (70) was instrumental in saving the lives of some of his relatives. After this he appears to have resided in Rome and to have devoted himself to literary studies. The exact period of his death is not ascertained. All we know is that he survived Herod Agrippa II, who died in 100. His works are: *History of the Jewish War*, in seven books, written both in Hebrew and Greek (the Hebrew version no longer extant); *Jewish Antiquities*, in 20 books, containing the history of his countrymen from the earliest times down to the end of the reign of Nero; an *Apology* of the Jews against Apion, valuable chiefly for its extracts from old historical writers; and an *Autobiography*, which may be considered supplementary to the *Antiquities*. The other works attributed to him are not believed to be genuine. Josephus in the main was honest and veracious; he had a sincere liking for his countrymen and much pride in the old national history; but the hopelessness of attempting to withstand the enormous power of the Romans, and an aversion to martyrdom, caused him to side with the enemy—perhaps in the faint hope of being thus of some use to the national cause. The influence of Greek philosophy and learning is visible in all his writings and, as far as biblical history is concerned, infused into it a tone of rationalism. He speaks of Moses as a human rather than a divinely inspired lawgiver; he rationalizes the miracles of the Old Testament, such as the crossing of the Red Sea and the healing of the waters of Marah. His style is easy and elegant, and Josephus has often been called the Greek Livy. A description of Christ (*Ant.*, xviii, 63 f.) has caused much discussion, but is not regarded as genuine. The editio princeps of the Greek text appeared at Basel (Froben) in 1544. Since then the most important edition (with notes) is that of B. Niese (7 vols., Berlin, 1885–95; the text alone, 6 vols., 1885–95). Consult: Bärwald, *Topographisch-historisches Lexicon zu den Schriften des Josephus* (Leipzig, 1879); Destinon, *Die Quellen des Flavius Josephus* (Kiel, 1882); Olitzki, *Flavius Josephus und die Halacha* (Leipzig, 1886); Krenkel, *Josephus und Lukas* (ib., 1894); Schmidt, *De Flavii Josephi Elocutione* (ib., 1894); Emil Schürer, *History of the Jewish People in the Time of Christ* (5 vols., New York, 1896); Drüner, *Untersuchungen über Josephus* (Marburg, 1897). The best-known version in English is by W. Whiston (London, 1737), revised by A. R. Shilleto, in *Bohn's Library* (5 vols., 1888–89); especially valuable is the translation of the *Jewish War* and the *Autobiography* by R. Traill (ib., 1862).

JOSH BILLINGS. The nom de plume of the American humorist Henry W. Shaw (q.v.).

JOSH'UA (Heb. *Yĕhôshu'a*, Yahwe is deliverance). The leader of Israel in the conquest of the land of Canaan. According to the Pentateuch, he was the son of Nun, of the tribe of Ephraim (Num. xi. 28; xiii. 8), led the fight against the Amalekites in the desert (Ex. xvii. 8–13), was sent by Moses among the spies that went into Canaan (Num. xiii. 8), and was appointed by Moses to be his successor (Deut. xxxi. 23). In the Book of Joshua he is represented as leading Israel in the crossing of the Jordan and the conquest of Palestine and as assigning the territories to the various tribes (Josh. i–xxiv). He is said to have died at the age of 110 (Josh. xxiv. 29).

This account of Joshua, according to the critics, is written from the point of view which regards the conquest of Canaan as the fulfillment of a promise made by Yahwe in the days of Moses. Many scholars have questioned the historical character of Joshua and regarded him as a mythical hero venerated in the cult at Timnath-serah (Josh. xxiv. 30). The name, when compared with the names used in Israel in the period of the Judges, is such as to awaken suspicions. Others consider it probable that an Ephraimitish leader took an active part in the first struggles for the possession of the land to the west of the Jordan and in the organization of the confederacy of the tribes that formed Israel. A slight transformation of the name is not impossible. Legend and dimmed tradition may have dealt generously with the historical element in the Joshua story. The long process involved in the conquest is pictured as though it took place in the days of Joshua and through the efforts of the popular hero. It is likely that many deeds ascribed to him belong to later periods. The supposed distribution of the lands among the tribes merely reflects the geographical position of the clans at a certain period after the conquest, probably subsequent to the reign of David.

JOSHUA. An oratorio by Handel (q.v.), first produced in London, March 9, 1748; in the United States, April 16, 1876 (Boston).

JOSHUA, Book of. The first of the four historical books in the Hebrew Bible, forming with Judges, Samuel, and Kings the division known in the Jewish canon as the Former Prophets. The Book of Joshua is mainly occupied with the narrative of the conquest of Canaan and with the settlement of the Hebrew clans in the newly gained territory.

Its contents may be summarized as follows: (*a*) Chaps. i–xii, crossing of the Jordan; capture of Jericho; advance to Ai; the ruse of the Gibeonites to save themselves from destruction; the subjugation of the south; campaign against the King of Hazor and allies; conquest of the north; list of victories. (*b*) Chaps. xiii–xxiv, distribution of the land to the trans-Jordanic tribes—to Caleb, Judah, Ephraim, and Manasseh; survey and allotment to the remaining tribes; Joshua's inheritance; designation of cities of refuge; Levitical cities; dismissal of trans-Jordanic tribes; final exhortations of Joshua; assembly and covenant at Shechem; death and burial of Joshua.

The authorship of the book is ascribed to Joshua in the Babylonian Talmud (*Baba bathra*, 14 a). Already Calvin questioned the accuracy of this ascription, and in modern times it has very generally been abandoned by scholars. It has been pointed out that the conception of the conquest of Canaan in certain parts of the book is in the strongest contrast with the more credible representation in the first chapter of the Book of Judges and in other parts of the Book of Joshua itself. While, according to the latter, the Israelitish tribes failed to dispossess the natives in large sections of the territory ideally assigned to them, so that many of the most important cities remained in the hands of the Canaanites for a long time, the former leaves the impression that the whole population was destroyed by the invaders, who had only to decide between themselves by lot what portion each tribe was to have. The quotation from the Book of Jashar (q.v.) in Josh. x. 12 has also been adduced against the traditional view, inasmuch as Joshua would not be likely to back up his account of his own victory by the testimony of a song already found in a book, and because this book is also said in 2 Sam. i. 18 to contain David's elegy over Saul and Jonathan. The passage (xxiv. 26) in which Joshua is claimed as the author seems very clearly to refer only to his farewell address, and the words "Joshua wrote in the book of the law of God" appear to indicate that this address was once found in a law book. The high eulogy passed on Joshua (iv. 4, vi. 27) and the account of his death and burial likewise seem to preclude a Joshuanic authorship. According to the generally prevailing view among Protestant scholars, the same sources that are supposed to have been used in the composition of the Pentateuch were also drawn upon in the Book of Joshua—the Yahwist and the Elohist particularly in the first half of the book and the so-called Priests' Code in the second. Some independent scholars who reject the current analysis of the Pentateuch still maintain that different sources were used, or that there has been a gradual expansion of the original text. (See PENTATEUCH.) It is generally admitted that the memory of some incidents in the early period of the invasion has been preserved in the book, such as the capture of Jericho, Ai, and Bethel, the battle of Gibeah, and others, though, in the judgment of many scholars, the genuine tradition has often been overlaid with legendary embellishments. The second part of the book is extremely valuable because of the information it gives concerning the boundaries of the different tribes and the chief cities and towns in each, even though occasionally cities are included which only ideally, and not actually, belonged to one or another of these tribes. In connection with the modern analytic theory the term Hexateuch (q.v.) has sometimes been used to designate the Pentateuch and the Book of Joshua.

Consult chapters on the conquest in the Hebrew histories of Kittel, Stade, Wellhausen, Guthe, Renan, and Piepenbring; the commentaries to the Book of Joshua by Keil, Dillmann, Oettli, Steuernagel, and Bennett; also Budde, *Richter und Josua* (Giessen, 1888); Albers, *Die Quellenberichte in Josua I.-XXI.* (Bonn, 1891); Addis, *Documents of the Hexateuch* (London, 1898); Carpenter and Battersby, *The Hexateuch* (ib., 1900); and the introductions to the Old Testament by Driver, Kuenen, Kautzsch, Kõnig, and Cornill.

JOSI'AH (Heb. *Yō'shiyyāhū*, Yahwe supports) (c.637–608 B.C.). King of Judah. He was the son of Amon and Jedidah and is said to have succeeded his father at the age of eight years (2 Kings xxii. 1). It is hard to believe that this figure can be correct. Of the early years of his reign we hear nothing. The compiler of Kings is chiefly interested in an important event that happened in the eighteenth year of the King's reign. According to chaps. xxii–xxiii, the priest Hilkiah found in the temple a book of the Law which he sent to the King through Shaphan, the scribe. The King, upon learning of the contents of the book, is in deep distress at the religious practices of the country, which are in flagrant contradiction to the ordinances in the Law book. He orders an assembly of the elders, and in solemn convocation it is agreed to abide in the future by the laws prescribed in the new book. The narrative then goes on to give an account of the radical religious reforms instituted by Josiah in destroying all Baal cults, in removing the priests from the high places, and establishing the worship of Yahwe in its pure form, freed from all foreign elements. There is no longer any question among scholars that the Law book "found" by Hilkiah was the legal portion of the present book of Deuteronomy (q.v.). This religious code was probably compiled either by Hilkiah or during the reign of Josiah's predecessor. Josiah's religious reform marks the end of an important epoch in the religious history of Israel. As a result of the efforts of Elijah, Elisha, and of such prophets as Amos and Hosea, two principles became established: (1) the worship of Yahwe to the exclusion of the Canaanitish Baalim; (2) the centralization of Yahwe worship in the sanctuary at Jerusalem. The times seemed ripe for taking a decisive step in the new direction, and Josiah favored the movement. A reaction set in after Josiah's death, but the zealous Yahwe worshipers had gained their point, and a new direction was given to religious development among the Hebrews. The reign of Josiah seems to have been a peaceful one until the close, when Necho II, King of Egypt, thought the time opportune, since Assyria's fall was imminent, to attempt to regain control of Syria and Palestine. Josiah encountered the Egyptian forces and met his death on the plain of Megiddo (2 Kings xxiii. 29–30). His death was regarded as a national calamity and must have been particularly startling to the pious, who felt that so zealous a follower of Yahwe was certain of divine favor and help. The religious reaction after Josiah's death against the Deuteronomic reforms may have been a direct consequence of the consternation that his tragic fate aroused, which naturally raised a doubt as to the correctness of the step taken by him. Consult Wellhausen, *Israelitische und jüdische Geschichte* (7th ed., Berlin, 1914).

JOSIAH ALLEN'S WIFE. The nom de plume of Marietta Holley (q.v.) and the title of one of her humorous sketches.

JOSIAS, yō-zē'ȧs, FRIEDRICH, PRINCE OF SAXE-COBURG (1737–1815). An Austrian general, son of Duke Franz Josias of Coburg. Entering the Austrian army in 1756, he served in the Seven Years' War as a colonel and against the Turks (1788–91), commanding a battalion and winning the battle of Martinestye. He was made field marshal lieutenant for his services in this campaign and in 1793 was put at the head of the army in the Netherlands. Here he was remarkably successful for a short time and brought Belgium once again into Austria's power. The French victory at Fleurus forced him to retire (1794). He left the army soon afterward and lived in quiet at Coburg. Consult Witzleben, *Prinz Friedrich Josias von Coburg-Saalfeld* (Berlin, 1859).

JÓSIKA, yō'shĭ-kō, MIKLÓS, BARON (1794–1865). An Hungarian novelist, born of a noble and distinguished family, April 28, 1794, at Torda in Transylvania. In his youth he served for some time in the Austrian army and then for many years devoted himself to agriculture and study. He was a member of the Transylvanian Diet in 1834 and again in 1847. His first works appeared in 1834 under the title of *Irány* (*Tendency*) and *Vázolatok* (*Sketches*) and were exceedingly popular. From that period till the revolution in 1848 he wrote about 60 novels, all of which were published at Budapest, and most of which have been translated into German. The most important are: *Abafi* (1836); *Az utolsó Bátory* (*The Last Batory*, 1838); *Zrinyi a költõ* (*The Poet Zrinyi*, 1840); *A Csehek Magyarországban* (*The Bohemians in Hungary*, dealing with the Hussites, 1840); and *Jósika István* (*Stephen Jósika*, one of the author's ancestors, 1847). Involved in the Hungarian revolution, he had to leave his native country, and afterward he resided at Brussels, where he continued his literary work. In 1864 he removed to Dresden, where he died in 1865. Among his productions written in exile are: *Egy Magyar család a forradalom alatt* (*A Hungarian Family during the Revolution*); *Die Familie Mailly*, like the foregoing first in German; *Eszter* (*Esther*); *A Szegedi boszorkányok* (*The Witches of Szegedin*). Jósika was a thoroughly natural novelist and drew his materials almost wholly from the history of his own land. He has been called the Walter Scott of Hungary, being the real founder of the historical novel of that country. His heroines are especially remarkable. Consult his Memoirs, *Emlékirat* (Budapest, 1865), which he was writing at the time of his death.

JOSIP'PON, Book of. A Hebrew chronicle, written in Italy in the tenth century and giving a history of the world from the Creation until the overthrow of the second temple by Titus. It claims to be a translation of Josephus, but the author employs the works of other writers, some of them very late. Lucian, Strabo, and St. Jerome were among his sources, and the book contains much extravagant legend. The author calls himself Joseph ben Gorion. The Jewish historian Graetz (*History of the Jews*, vol. iii, p. 180) holds that the work was originally written in Arabic, but this view has not been accepted. The book was first published in 1476 at Mantua and during the following centuries enjoyed great popularity, several editions appearing besides translations into Latin and German.

JOSQUIN, zhôs'kăN', Deprès. See Deprès, Josquin.

JOSS (a pidgin-Eng. corruption of Portug. *deos*, from Lat. *deus*, god). A pidgin-English term which is sometimes found in modern books of travel, in newspapers, etc., as well as colloquially in connection with Chinese matters. It is used for God and is also applied to Chinese idols (joss), temples, and churches (joss houses), the gilt paper on which charms and amulets are printed or in which they are neatly wrapped up (joss paper), and also the fragrant incense sticks (joss sticks) burned before the idols. The so-called "stick" is a paste made of the dust of various scented woods held together with clay, which in its combustion serves as a rude measure of time at night. The paste is rolled around the upper part of a stick of bamboo and in that form is commonly known. *Joss pidgin* means "religious ceremony," and clergymen and priests are spoken of as "joss-pidgin men." Joss paper to represent money is especially used at funerals or at the front doors of shops and houses. When incinerated, the Chinese idea is that this paper changes into real money in the spirit world.

JOSSELYN, jŏs'lĭn, John (seventeenth century). The author of one of the earliest accounts of the English settlements in New England. He was the son of Sir Thomas Josselyn, a knight of Essex, England, where he was born probably early in the seventeenth century. His brother Henry had sailed for New England as the agent for John Mason, the patentee of New Hampshire, in 1634, and had continued in the service of Mason's successor, Sir Ferdinando Gorges. It was at his brother's solicitation that John Josselyn visited New England in 1638, sailing from England late in April of that year and arriving in Boston on July 2. Thence, after calling upon John Winthrop and John Cotton, to whom he had letters, he proceeded to Black Point, Scarboro (Me.), where his brother Henry was stationed. He returned to England in October, 1639. It was not until 1663 that he returned to New England. He remained in America until December, 1671, traveling extensively through the other settlements in New England and noting facts as to their government, history, social life, and products. Upon his return to England he published his observations in two books. The first was entitled *New England's Rarities Discovered in Birds, Beasts, Fishes, Serpents, and Plants of that Country* (1672; reprinted in Boston, 1865). His second and more valuable book from the historical point of view is *An Account of Two Voyages to New England* (London, 1674; reprinted, Boston, 1869; also in *Collections of the Massachusetts Historical Society* for 1834).

JOST, yōst, Isaak Markus (1793–1860). A German-Hebrew historian, born in Bernburg. He studied philology at Göttingen and Berlin and was principal of a school in the latter city in 1826–35 and subsequently of the Jewish Realschule at Frankfort. His principal works are: *Geschichte der Israeliten* (9 vols., 1820–29; to which was added a tenth volume in 1849, entitled *Neuere Geschichte der Israeliten von 1815–45*); *Allgemeine Geschichte des israelitischen Volkes* (2 vols., 1831–32); a translation (into German) of the *Mishna*, with text and commentary (6 vols., 1832–34); and *Geschichte des Judentums und seiner Sekten* (3 vols., 1857–59). He also edited a journal entitled *Israelitische Annalen* (1839–41). Consult Zerndorf, *Isaak Markus Jost und seine Freunde* (Cincinnati, 1886).

JOTA, hō'tȧ. A Spanish dance in ¾ time, especially popular in Aragon. It is danced by couples and somewhat resembles a waltz, though there are many extempore variations of step. Its rapid, striking music is furnished by mandolins, castanets, and a song, whose couplets are often extemporized and are of a satirical or romantic character. The jota is sometimes danced as a solemn rite at funerals.

JOTUNHEIM, yō'tụn-hām (Icel., giants' home). In Norse mythology, a region of cold and darkness, extending around the rim of the earth, the abode of the frost giants.

JOTUNN, yō'tụn (Icel., giant, devourer). In Norse mythology, a race of giants and magicians, generally hostile to human beings, dwelling in caves in Jotunheim, and carrying on constant warfare with the powers of light. Originally giants of the storm, they are pictured as having power over the forces of nature. They are the enemies of Thor, who prevents their attempt to storm heaven.

JOUBERT, zhōō'bâr', Barthélemy Catherine (1769–99). A French Revolutionary general, born at Pont-de-Vaux, Ain. Though educated for the career of an advocate, Joubert showed early his preference for a military career, and enlisted as a volunteer in 1791, served in the Army of the Rhine, and, four years later, was made a general of brigade for brilliant service. In the Italian campaign of 1796–97 he acted as second in command to Bonaparte, being made general of division. He distinguished himself at the siege of Mantua and in the battle of Rivoli, in January, 1797; took Trent in the following year and led a French army of invasion into Tirol, effecting a junction with Napoleon. He subsequently commanded in Holland and on the Rhine and in 1798 was made head of the Army of Italy. He overran Piedmont and forced King Charles Emmanuel to abdicate. In June, 1799, he was made commandant of Paris, but soon after was sent to replace Moreau in Italy, where he gained slight advantages over the combined Russian and Austrian forces, but was defeated by Suvaroff at Novi, where he fell mortally wounded, August 15, at too early an age to have won the military reputation to which his talents entitled him. A monument raised to his memory was demolished by order of Louis XVIII, but another was erected later in his birthplace. His biography has been written by Chevrier (2d ed., Paris, 1884).

JOUBERT, JOSEPH (1754–1824). A noteworthy French philosopher, born at Montignac (Périgord). He studied at the College of Toulouse, at that time conducted by the Jesuits, and was subsequently assistant master in the institution, but had to resign because of failing health. In 1778 he went to Paris, where he became the friend of Chateaubriand and Fontanes. In 1790–92 he was justice of the peace at Montignac and in 1809, at the instance of Fontanes, the grand master, was appointed by Napoleon a councilor of the newly organized University of Paris. Of frail health, he lived at Paris and at Villeneuve in Burgundy, where he was greatly inspired by Madame de Beaumont. He was constantly reading and taking notes, writing letters, and receiving the inevitable throng of friends who came to hear his extraordinary conversation, much, Matthew Arnold observes, as Englishmen flocked to hear that of Coleridge. In 1838 Chateaubriand edited a privately printed volume of fragments, which was reviewed by Sainte-Beuve in the *Revue des Deux Mondes*, and which established Joubert's fame. The best edition is that by P. de Raynal, entitled *Pensées; précédées de sa correspondance, d'une notice sur sa vie, son caractère et ses travaux* (Paris, 1864). Selections from his writings have appeared in Charles Dudley Warner, *Library of the World's Best Literature* (New York, 1896–97), and in a volume of translations by Katharine Lyttleton (ib., 1899). Consult: Condamin, *Essai sur les pensées et la correspondance de Joubert* (Paris, 1877); E. M. Caro, *Mélanges et portraits* (ib., 1888); and the fine appreciation in Matthew Arnold, *Essays in Criticism* (London, 1907).

JOUBERT, PETRUS JACOBUS (1831–1900). A Boer general and politician. He was born in the Oudsthoorn District of Cape Colony, of Dutch-Huguenot parents, his French ancestor, Joubert, having emigrated to South Africa in 1687 to escape religious persecution in France. After an elementary education and a youth spent in trading expeditions throughout South Africa, Piet Joubert, as he was called, settled in the Wakkerstroom District of the South African Republic and became a prosperous farmer and cattleman. In the early sixties he was elected a member of the Volksraad, and in 1870, having already had some experience in legal work, he was made Attorney-General of the Republic and became prominent politically. From that time on he was more or less the political rival of Kruger (q.v.). In 1874 Joubert acted as President during the visit of President Burgers to Europe, and his political opportunism earned him the name of Slim (or crafty) Piet. In 1880, on the outbreak of war with England, Joubert became commandant general of the forces and won the battles of Laing's Nek, Ingogo, and Majuba Hill (q.v.), the last of which closed the war in favor of the Boers in 1881. In 1883–84 he was acting President during Kruger's absence in Europe, and in the latter year he opposed the plan of annexing Bechuanaland to the Transvaal. Later he favored a liberal policy towards the Uitlanders in the country. He was defeated by only 800 votes in the contest against Kruger for the presidency in 1893, but he became Vice President and general commander of the army and frustrated the attempted raid by the forces of Dr. Jameson near Krugersdorp in January, 1896. When the relations between the Transvaal and England had become strained, in 1899, Joubert wrote an appeal to Queen Victoria in which he stated the case of the Boers. Joubert was the ablest of the Boer military men, and to his efforts in great measure was due the fact that the Transvaal was prepared with arms and munitions of war when the Republic declared war against Great Britain in October, 1899. As commandant general of the Boer forces, he began the campaign in Natal and laid siege to the town of Ladysmith, showing remarkable generalship as long as he remained in the field. But early in 1900 his health broke down, and he was forced to retire to Pretoria, where he died (March 27, 1900). Joubert commanded the profound respect of his enemies for his ability and honor, but his liberal views on many points did not commend him to the mass of the Transvaal Boers, who preferred Kruger's conservatism. See TRANSVAAL; SOUTH AFRICAN WAR.

JOUETT, jou′ĕt, JAMES EDWARD (1828–1902). An American naval officer, son of the artist Matthew Harris Jouett. He was born at Lexington, Ky., was appointed a midshipman in the navy at the age of 13, and served on the *Independence*, and against slavers on the *Decatur*. During the Mexican War he was stationed in southeastern Texas. In 1861, soon after the outbreak of the Civil War, he entered Galveston Bay with a small detachment of marines and destroyed the *Royal Yacht* after a fierce fight. He was equally prominent in the operations in Mobile Bay under Farragut in 1864, and his promotion of 30 numbers, for his services in the capture of the *Selma*, was recommended by Farragut. Jouett became captain in 1866 and commodore in 1883, and in 1885 he commanded the North Atlantic squadron and opened the Isthmus of Panama. He became a rear admiral in 1886 and soon afterward was made president of the board of inspection and survey. He retired in 1890, and in 1893 Congress voted him full pay for life.

JOUETT, MATTHEW HARRIS (1783–1827). An American painter, born in Mercer Co., Ky. He was the pupil for a short time of Gilbert Stuart in Boston, painted all through the country from Kentucky to the Gulf, and was recognized as the best painter "west of the Mountains." Although weak in drawing, his paintings please by reason of their rich, harmonious color. His portrait of John Grimes is in the Metropolitan Museum, New York, and his full-length of Lafayette is in the capitol at Frankfort, Ky.

JOUFFROY, zhōō′frwä′, FRANÇOIS (1806–82). A French sculptor, born in Dijon. He was a pupil of the younger Ramey and at the Ecole des Beaux-Arts, and won the Prix de Rome in 1832. He became a member of the Institute in 1857, Officer of the Legion of Honor in 1861, and professor at the Beaux-Arts in 1863. He was par excellence the official sculptor of his period, and commissions were heaped upon him. Among his works are the marble statue of St. Bernard, at the Panthéon in Paris; the monument to St. Bernard, at Dijon; Napoleon, at Auxonne; Pierre de France, the Duc de Longueville, the Duc d'Alençon, Marie Leczinska, at Versailles; "Young Girl Telling her Secret to Venus," at the Louvre, which almost justifies the high regard in which Jouffroy was held by his contemporaries. His works are characterized by grace and delicacy.

JOUFFROY, Théodore Simon (1796–1842). A French philosopher. He was born at Pontets, Doubs, and studied philosophy at Dijon and under Cousin at the Ecole Normale, Paris, where at 21 years of age he began to teach. After many changes he became in 1838 librarian to the University of Paris, which position he filled till his death on Feb. 4, 1842. He published translations of the works of Reid and translated also some of the works of Dugald Stewart, with notes and introductions, besides writing *Cours de droit naturel* (Paris, 1834–35) and *Mélanges philosophiques* (ib., 1833; selected translations by George Ripley, Boston, 1838). Some of his works appeared posthumously. He opposed the sensualism of Condillac and all tendencies to identify psychology with physiology; in general, his position was similar to that of Cousin (q.v.). Consult Tissot, "Théodore Jouffroy, sa vie et ses écrits," in *Mémoires de l'académie de Dijon*, vol. iii (Dijon, 1875–76).

JOUFFROY D'ABBANS, dȧ'bäɴ', Claude François Dorothée, Marquis de (1751–1832). An inventor and engineer. He was born in France in 1751 and spent the early portion of his life in the army. Witnessing the operation of a fire engine, he believed that steam could be used for vessels on water. He made his first attempt with a boat equipped with a Watt engine and "duck-foot" paddles mounted on a chain on the river Doubs in 1776, but the experiment was a failure. In 1780 he built a novel form of engine for a boat 150 feet long, and in 1783 he made another experiment on the Saône, with more success. Owing to various technicalities, the Academy refused to indorse the experiments, and the government declined to grant a promised monopoly. Impoverished and discouraged, Jouffroy went to England and was active in political plots, siding with the Bourbons. Returning to France, he became acquainted with Fulton, who admitted the merit of the experiments. He received permission in 1816 to form a company, and put his first steamer, called *Charles Philippe*, on the Seine; but the attempt was unsuccessful. He withdrew to the Hôtel des Invalides and died there of cholera. His claim was acknowledged by Arago and in 1840 by the French Academy. Jouffroy published *Les bateaux à vapeur* and wrote for the Academy *Mémoires sur les pompes à feu*.

JOUGS, jōōgz (OF. *joug*, yoke, from Lat. *jugum*, yoke; connected with Gk. *ζυγόν*, *zygon*, Skt. *yuga*, Goth. *juk*, OHG. *joh*, Ger. *Joch*, AS. *geoc*, Eng. *yoke*, from Lat. *jungere*, Gk. *ζευγνύναι*, *zeugnynai*, Skt. *yuj*, to join), Juggs, or Joggs. A form of pillory used in Scotland as well as in the Low Countries. It consisted of an iron ring, or collar, fastened by a chain of two or three links to a pillar or wall in some public place, such as a market cross, a prison door, a church door, a churchyard gate, a tree beneath whose branches courts and the like were held. The ring or collar opened by a hinge or joint, so as to inclose the culprit's neck, when it was secured by a loop, or staple, and a padlock. Jougs were employed as a punishment for ecclesiastical as well as for minor civil offenses in the fifteenth to the eighteenth centuries. Although they have not been in use for the last 100 years, they may still be found hanging at a few country churches. Branks (see Brank) were occasionally hung on the same pillar with the jougs. See Pillory; Stocks.

JOULE, joul (named in honor of James P. Joule). The joule is the practical unit of energy or work. It is 10^7 ergs. See C. G. S. System of Units; Mechanical Units; Mechanics, *Work and Energy*.

JOULE, James Prescott (1818–89). An English physicist. He was born at Salford, near Manchester, England. His father was the proprietor of a large brewery, and he took advantage of the opportunities offered by the equipment of such a plant to perform many of his best-known investigations. He was an invalid all his life, owing to a spinal trouble. His early education was secured at home, the chemist Dalton being the young man's instructor, and at the age of 19 he published in the *Annals of Electricity* a description of an electromagnetic engine which he had himself invented. In the course of researches on electricity he was able to show that in electric conduction the amount of heat absorbed was equivalent to the heat produced during the original combination of the elements in the cell which produced the current. Joule was the first Englishman to ascertain the mechanical equivalent of heat (see Heat), and in an address delivered in 1847 at Manchester he stated the doctrine of the conservation of energy. The paper was hardly noticed by press or scientists, and a similar paper presented to the British Association would also have been passed over had its merits not been seen by William Thomson, afterward Lord Kelvin. Joule worked for 40 years to determine the mechanical equivalent of heat, using both electric currents and the mechanical friction of water, and obtained a number of values for this quantity. Many researches on electricity and thermodynamics are to be credited to him, and his name is given to the unit of work, while Joule's law for determining the amount of energy in an electric circuit has become fundamental in electrical science. Dr. Joule received the Copley and other medals and numerous honors from the leading universities and scientific societies throughout the world. His *Scientific Papers*, in two volumes, were published in 1885 and 1887, and numerous valuable communications from him are to be found in the various English journals and in the proceedings of societies. Consult Osborne Reynolds, *Memoir of James Prescott Joule* (Manchester, 1892).

JOURDAIN, zhōōr'däɴ', Monsieur. The leading character in Molière's *Bourgeois gentilhomme*.

JOURDAN, zhōōr'däɴ', Jean Baptiste, Count (1762–1833). A French marshal. He was born April 29, 1762, at Limoges, where his father was a surgeon. He entered the army in 1778 and served under Count d'Estaing in the War of American independence. On returning to France in 1784 Jourdan married and opened a milliner's shop at Limoges. On the breaking out of the Revolution he abandoned trade and became the captain of the company of National Guards raised in Limoges. Under Dumouriez he rose to be chief of battalion, and in 1793 was made successively general of brigade and general of division. Finally in the autumn of that year he obtained the command of the Army of the North and gained an important victory at

Wattignies against the Austrians (Oct. 15–16, 1793). In 1794, as head of the Army of the Sambre and Meuse, he defeated the Austrians again at Fleurus and overran Belgium, forcing the enemy back across the Rhine. In 1795 he was less successful in his campaigns; for, having crossed the Rhine at Düsseldorf, he was defeated by the Austrians at Höchst (Oct. 11, 1795). In 1796 he pushed his way far into Germany, but was driven back by the Archduke Charles at Wetzlar (June 15), Amberg (August 24), and Würzburg (September 3). This discomfiture, for which the plan of campaign as worked out in Paris was responsible more than he, led him to resign his command and to devote himself to politics. In 1799 the Directory intrusted him with the command of the Army of the Danube; but he was defeated by the Archduke Charles at Ostrach and at Stockach in March of the same year and was superseded. Although he opposed the coup d'état of the Eighteenth Brumaire, the First Consul employed him in 1800 in the reörganization and administration of Piedmont; and on the establishment of the Empire in 1804, he was made a marshal. In 1803 he had been given the command in Italy, but in 1805 he was replaced by Masséna. He was sent with King Joseph to Naples (1806), and in 1808 he went with him to Spain as chief of staff. Louis XVIII appointed him commander of the seventh military division and made him a peer of France; but his Republican principles led him to enter heartily into the revolutionary movement of 1830, and for a short time after the July revolution he acted as Minister of Foreign Affairs. His last years were spent as governor of the Hôtel des Invalides, and there he died (Nov. 23, 1833). As member and president of the Council of Five Hundred (1797–99), Jourdan was instrumental in planning and establishing the system of military conscription throughout France. Unlike many of Napoleon's marshals, Jourdan lived and died poor. He was the author of *Opérations de l'armée du Danube* (Paris, 1799) and *Mémoires pour servir à l'histoire de la campagne de 1796* (ib., 1819). His *Mémoires militaires, guerre d'Espagne* was published in 1899.

JOURNAL. See Bearing.

JOURNAL DE SAINT-PÉTERSBOURG, zhōōr'nȧl' de săɴ'pā'tĕrz'bōōr' (Fr., Journal of St. Petersburg). A political daily paper, at St. Petersburg, founded in 1825. It is issued in French and is the organ of the Ministry of Foreign Affairs.

JOURNAL DES DÉBATS, dȧ dȧ'bȧ' (Fr., Journal of the Debates). A Paris daily paper, founded in 1789 to report the sessions of the National Assembly. Since 1800 it has been owned by members of the Bertin family. In politics it pursues a moderate Republican course.

JOURNALISM. See Newspaper; Periodical.

JOURNALISM, College. Like the system of Greek-letter fraternities, college journalism, embracing those periodicals edited and published wholly or partly by undergraduates and devoted to student interests, is a form of student activity which is almost entirely restricted to American institutions. It is differentiated from the departmental and official publications of the university by the fact that its sphere embraces all the varied interests of the student body and not alone the educational, and that it provides the channel for the expression of student opinion, formerly voiced through the oration and the debating society. Students in the English universities have from time to time attempted to establish publications similar to college papers in the United States, the most notable of which, *The Snob*, was edited by Thackeray while at Cambridge in 1829. While other efforts in the direction of college journalism in England were made sporadically, in the initial stage many of the journals rarely lasted longer than the college life of their original projectors. At Oxford and Cambridge weekly magazines are issued dealing largely with events of current interest in the respective universities, but include also reports of more important lectures and general articles by undergraduates and dons. In addition to these general university magazines a number of the colleges issue their own journals, and there are, besides, university magazines of lighter character. It may be said that all universities and colleges in the British Isles now have their students' magazines, which appear, as a rule, once a month. Such magazines are published by a student editorial board and are self-supporting. No college daily has yet appeared. The secondary schools also issue school journals of a general character. In the United States the college paper originally took the form of a periodical devoted to the publication of essays, serious poems, and criticisms, and often supplemented the literary societies. With the broadening of the student life there came a change in the character of the periodicals until to-day the students of nearly every American college support from one to a dozen periodicals. In recent years the institution has worked downward to the preparatory schools as well, and many of these maintain successful school papers modeled on the college publications.

The first American college periodical was the *Gazette*, published at Dartmouth in the year 1800. Daniel Webster, of the class of 1801, was its editor. The *Yale Literary Cabinet* was published in 1806 by the senior class of that year, and this was followed by the *Harvard Lampoon* in 1812. The oldest college paper now in existence is the *Yale Literary Magazine*, which dates from 1836. In the 20 years preceding that date there were born and died at Yale, besides the *Literary Cabinet*, the *Athenæum*, *Crayon*, *Sitting-Room*, *Students' Companion*, *Gridiron*, and *Medley*. Next to the Yale "*Lit.*," the paper which has had the longest existence is the *Nassau Literary Magazine*, founded in Princeton in 1842. The number of publications which have enjoyed only a temporary existence during the 100 years of college journalism is unknown, but it must have been very large. According to the best information obtainable, Amherst now supports 3 college papers, Brown 3, Leland Stanford 4, California 3, Columbia 5, Cornell 6, Harvard 7, Michigan 5, Minnesota 4, Pennsylvania 5, Princeton 4, Yale 6, Kansas 4, Wisconsin 4, and Tulane, Williams, Wellesley, Dartmouth, Missouri, Chicago, 2 each.

College journalism is represented by periodicals devoted to (1) literary matter exclusively; (2) news and some literary matter; (3) news and comment; (4) the comic and burlesque; (5) historical record; (6) the interests of certain departments or professional schools; and (7) the interests of the alumni. The typical forms are the daily, weekly, monthly, and annual, though there are many intermediate forms, like the semiweekly, biweekly, or quarterly. The most popular forms of the college paper to-day are the daily and weekly, the weekly performing the same service in the smaller college that the daily does in the university, that of a newspaper pure and simple. The first ventures in the field of daily journalism appear to have been made in the universities of the Middle West; thus, the *Daily Illini* was issued at the University of Illinois in 1871 and the *Daily Student* at the University of Indiana in 1874. Of the better-known college dailies, however, the precedence in point of time is taken by the *Daily Princetonian*, which was established in 1876 and was soon followed by the *Yale News* (1878), the Harvard *Echo*, now the *Crimson* (1879), the *Cornell Daily Sun* (1880), and the *Pennsylvanian* (1884). Tradition takes the *Columbia Spectator* back to 1877, but its existence in its present form has only been continuous since 1902, when it replaced the *Acta Columbiana*. A college daily is now published in about 20 universities in the country, including, in addition to the above, the following: *Daily Palo Alto* (Leland Stanford, 1892), *Daily Californian* (California, 1893), *Maroon* (Chicago, 1892), *Purdue Exponent*, the *Daily Iowan* (Iowa, 1901), *University of Michigan Daily* (1890), *Minnesota Daily* (1900), *University Missourian* (1908), *Daily Nebraskan* (1901), *Daily Orange* (Syracuse, 1903), *Brown Herald* (Brown, 1891), *University of Washington Daily*, *Wisconsin Cardinal* (1892). A number of triweeklies are maintained, e.g., the *Northwestern* (Northwestern University, 1871) and the *Tech* (Massachusetts Institute of Technology, 1883); while in a few other institutions semiweekly papers are issued, e.g., *Scarlet and Black* (Grinnell, 1894), *Students' Herald* (Kansas A. and M. College, 1895), *I. S. C. Student* (Iowa State Agricultural College, 1890), *Williams Record* (Williams, 1874), *Denison Collegian*, and the *Brown and White* (Lehigh, 1894). Many of the latter class are probably on the way to becoming dailies. The typical daily is a four to eight page paper, devoted entirely to news and items of current student interest, and forms an important factor in student affairs. So much is this the case that the *Yale News* is commonly said at New Haven to "run the college."

The weekly college paper has increased in proportion more rapidly than the dailies. There are now about 92 weeklies in circulation in the leading institutions of college rank. It is to be noticed that historically the weekly is prior to the daily. The following college weeklies may be mentioned: *Amherst Student* (1867), *Dartmouth Weekly* (1867), *Scholastic* (Notre Dame, 1867), *Wesleyan Argus* (1868), *Rutgers Targum* (1869), *Campus* (Rochester, 1874), *The Fayette* (Lafayette, 1875), *Colby Echo* (1876), *California Occident* (1881), *Delphic* (Drake University, 1884), *Silver and Gold* (University of Colorado, 1892), *Knox Student* (1894), *Tufts Weekly* (1895), the *Triangle* (New York University, 1895), *Hamilton Life* (1898), *Syracuse Weekly* (1900), *Barnard Bulletin* (1901), the *Texan* (University of Texas), and *Olive and Blue* (Tulane). Most of these are devoted almost wholly to news, although a number are entirely literary in character, whilst several others include both news and literary matter.

The monthly magazines now make up the majority of college journals, more than 280 being issued. They include the *Amherst Literary Monthly* (1886), the *Brunonian* (Brown University, 1829), the *California Magazine* (1895), the *Columbia Monthly* (1893), the *Cornell Era* (1868), which absorbed the *Cornell Magazine* in 1900, the *Dartmouth Magazine* (1892), the *Hamilton Literary Monthly* (1866), the *Harvard Monthly* (1885), the Lafayette *Touchstone* (1896), the Michigan *Inlander*, the *Minnesota Magazine* (1895), the *Red and Blue* (University of Pennsylvania, 1886), the *Nassau Literary Magazine* (1842), the Syracuse *Herald* (1872), the *University of Virginia Magazine* (1840), and the *Williams Literary Monthly* (1885). In addition to the Hamilton *Life*, the official publication of the fraternities, the non-fraternity men at Hamilton publish about six times a year the *Review*. The *Harvard Illustrated Magazine*, established as a monthly in 1899, still stands in a class by itself. Among the more important papers published at women's colleges are the *Barnard Bear*, *Mount Holyoke*, *Wellesley Magazine*, *Radcliffe Magazine*, *Wells College Chronicle*, *Smith College Monthly*, and *Vassar Miscellany*.

While the dailies, weeklies, and monthlies form the largest class, these must be supplemented by the biweeklies and bimonthlies, and a number that are published at irregular intervals. There are about 30 journals that appear fortnightly, including the *Yale Courant* (1865), the *Yale Record* (1871), the *Harvard Advocate* (1866), the *Earlhamite*, the *Wrinkle* (University of Michigan), the *Oracle* (Hamline, 1888), the *State* (Stevens Institute of Technology), *Chapparal* (1900) and *Sequoia* (1891), both of Leland Stanford Junior University. The 14 bimonthlies include the *Coe College Cosmos* (1890), the *Worcester Polytechnic Journal*, the *Beacon* (Boston University), and the *Sibyl* (Elmira, 1871). The *Trinity Tablet* (Trinity College, 1868) is issued every three weeks.

The humorous college papers are few in number and generally conducted on the lines of the New York *Life* rather than of *Puck* or *Judge*. In fact, *Life* may be said to be the outgrowth of the college humorous magazines, since it was actually established by former editors of the *Harvard Lampoon*, and its success was due to *Lampoon* men and former editors of the *Columbia Spectator* and *Acta Columbiana*. Besides the *Harvard Lampoon*, established in 1876, the most important humorous college papers are the *Cornell Widow*, the University of Michigan *Wrinkle*, the *Yale Record*, all biweekly; the *Princeton Tiger*, monthly, and the *Columbia Jester*, a biweekly. In 1900 the *Punch Bowl* was started at the University of Pennsylvania as a monthly humorous magazine. At the University of California the literary monthly publishes a humorous illustrated supplement called the *Axe*.

Alumni news is sent out in some form from many colleges, often by the faculty in the form of a weekly, monthly, or quarterly magazine. An alumni newspaper published by a joint board of alumni and undergraduates is a less common form, but in those cases in which it exists the results are highly satisfactory and present perhaps the most successful examples of college journalism. The *Yale Alumni Weekly*, the *Cornell Alumni News*, *Columbia Alumni News*, and the *Princeton Alumni Weekly* are among the best-conducted college papers of any kind. Harvard publishes the *Harvard Bulletin*, weekly, and the *Harvard Graduate Magazine*, established as a quarterly in 1893. Some other colleges maintain alumni papers, but those already quoted are representative of the class.

Many of the professional schools publish magazines of a serious nature, devoted to particular interests. Examples are the *Harvard Law Review* (weekly), the *Pennsylvania Dental Journal* (monthly), the *American Law Register* (University of Pennsylvania, monthly), the *Phagocyte* (Tulane Medical School), the *Yale Medical Journal*, the *Sibley Journal* (Sibley College, Cornell), the *Columbia School of Mines Quarterly*, and the *Columbia Law Review*. Some of these professional journals take high rank in the outside world. In some cases, as in the *Sibley Journal*, they are managed entirely by undergraduates; in others there are associate or advisory faculty or alumni editors.

The college annual gives a survey of the year's collegiate history. It contains statistics and records of the fraternities, clubs, societies, athletic events, and other matters of interest to students, and includes daring attempts at humor aimed at the students and the faculty. The cost of preparing one of these yearbooks already mounts into the thousands of dollars. They are yearly growing in size, and more and more attention is paid to art work in their preparation. Some of the college annuals are the Amherst *Olio*, the Brown *Lieber*, the California *Blue and Gold*, the Chicago *Cap and Gown*, the *Columbian* (formerly the *Columbiad*), the *Cornellian*, the Dartmouth *Ægis*, the Harvard *Register*, the *Hullabaloo* of Johns Hopkins, the Lafayette *Mélange*, the Lehigh *Epitome*, the *Michiganensian*, the Minnesota *Gopher*, the Pennsylvania *Record*, the Princeton *Bric-à-Brac*, the Stanford *Quad*, the Syracuse *Onondaguan*, the Texas *Cactus*, the Trinity *Ivy*, the Tulane *Jambalayo*, the Vermont *Ariel*, the Virginia *Corks and Curls*, the Williams *Giulielmensian*, the Yale *Banner* and *Potpourri*.

The peculiar system of management by which the college paper is perpetuated from year to year also involves a periodical fluctuation in the literary value of the contributions. Each year as a portion of the board of editors are graduated or pass to a higher class, an equal number of new classmen are elected to take their places. By this means the publication is kept alive, and its general tone and policy are preserved, while its literary standard is raised or lowered as the new editors are more or less clever than their predecessors. The college paper is generally recognized and encouraged by the faculty of the institution, and in some cases substantial acknowledgment is made for work done by the editors. In the majority of institutions the college papers, in common with other student organizations, are provided with office room, heat, light, and service.

Competition for places on the editorial boards of college papers is often very keen. The method of selecting editors varies considerably, vacancies being filled on the basis of literary competition, class election, editorial or faculty appointment, excellence in class work, fraternity or society representation, and various other ways. When editors are elected by the student body, they are held responsible to it, while they are left free in the internal management of the paper. The Cornell *Sun* is chartered by the whole student body; other papers are official society organs, close corporations, or stock companies. The evil effects of college politics are often apparent in the selection of editors, leading sometimes to the establishment of rival papers and to an injurious form of competition. Cases of the abuse of editorial positions for personal ends or animosities are noticeably rare, although no checks except student sentiment exist to prevent it.

A diversity of opinion exists as to the influence of the college paper in developing literary talent among the undergraduates. It seems probable that the general training in the various features of journalism now acquired by editors of college papers is at least equivalent to the purely literary training given by the old literary periodicals. It is a fact that numbers of the most successful of our younger writers have served their apprenticeship on the editorial board of college publications, which are increasingly recognized as valuable training schools for journalistic work. A college editor has much to unlearn when he takes a place on the daily paper, but he has at the same time acquired much valuable experience in editorial and business management and in reportorial work. The college paper, as now conducted, affords an agreeable and profitable employment and gives to friends of an institution an actual insight into the life of the college that cannot be gained from any official catalogue or report. Like general newspapers, the college paper has its exchange list, and its editors and readers are thus kept in touch with the doings and sentiments of all other colleges. To the instructors the college press affords the surest indication of student sentiment, and is helpful in the solution of educational problems affecting the institution. There are now in the United States and Canada, according to the best newspaper directories, about 500 undergraduate publications, not including alumni and professional school magazines and the official publications of the Greek-letter societies. See FRATERNITIES, AMERICAN COLLEGE.

JOURNALISTEN, zhṳr′nȧ-lĭs′ten, DIE (Ger., The Journalists). A comedy by Gustav Freytag (1853), which deals with the influence of the press on German political and social life.

JOUR′NEYMAN (from *journey*, day's work, from *journee*, Fr. *journée*, from ML. *diurnata*, day's work, day's journey, from Lat. *diurnus*, daily, from *dies*, day + *man*). A term originally applied to laborers working by the day, but in the late Middle Ages applied to the laborers in the guilds who had completed their apprenticeship, but who had not attained the position of master. In contrast with the modern workman, the journeyman in the most flourishing period of the guilds was not a wage earner for life, but could look forward to the independent position of master. As industry became more complex and required a greater outlay for the necessary tools and materials, the possibility of attaining mastership practically ended, and journeymen became a permanent class of skilled wage earners. See GUILD.

JOUSTS, jŭsts (OF. *joste*, *jouste*, It. *giostra*, from OF. *juster*, *joster*, *jouster*, It. *giostrare*, to joust, from ML. *juxtare*, to approach, tilt, from Lat. *juxta*, near). Contests on horseback, engaged in as trials of strength in the Middle Ages by knights and nobles. In the jousts the combatants engaged one another singly, each against his antagonist, and not in a troop, as in the tournament (q.v.). The lance was the weapon chiefly used.

JOUTEL, zhōō'tĕl′, Henri (c.1650–?). A French explorer, born in Rouen, the son of a gardener in the employ of Henri Cavelier, an uncle of La Salle (q.v.). He joined La Salle's expedition, which left France in 1684 to found a colony at the mouth of the Mississippi. When La Salle started through the wilderness for Canada, where he hoped to secure aid, he left Joutel in command of the post, St. Louis, which he had established on what proved to be an estuary on the coast of Texas. Joutel's administration was disturbed by plots and intrigues, the colonists being thoroughly disheartened. After La Salle's return the discontent increased, and finally in 1687 La Salle made a second and more determined attempt to reach Canada. Accompanied by his brother Jean, his two nephews Moranget and Cavelier, Joutel, and about 15 others, he again started from the little colony; but scarcely two months later, while encamped on a branch of the Trinity River in Texas, La Salle, Moranget, and two others were assassinated by four or five malcontents. Joutel and those of his companions who were loyal to La Salle were forced to conceal their horror at this deed, fearing a like fate for themselves; and the whole party pushed on to the Cenis villages, which had been the farthest point reached by La Salle in his first attempt. Here they remained for some time, the murderers not caring to enter Canada, where justice awaited them, and being equally unwilling to allow the others, who might become witnesses against them, to proceed on their journey. At last, however, the assassins quarreled among themselves, and this afforded the others a chance to escape. After more than two months of travel through the wilderness, Joutel and his companions finally reached the Mississippi, which they ascended to the Illinois, where they spent the winter at Fort St. Louis. The next spring they pushed on to Canada and took ship to France. Joutel wrote a *Journal historique du dernier voyage que feu M. de la Salle fit dans le Golfe de Mexique*, trans. by H. R. Stiles (Albany, 1906), which is probably the most trustworthy account of the expedition.

JOUVENET, zhōō'v'-nā′, Jean (1644–1717). A French painter, born at Rouen. He was the most celebrated of a family of painter sculptors and was the son and pupil of Laurent Jouvenet, called The Younger (1609–81). He afterward studied at the Royal Academy in Paris and worked with Charles Lebrun, whom he assisted with the decorations of Versailles from 1661 to 1680. He soon became well known and was successively member (1675), professor (1687), and perpetual rector of the Royal Academy of Painting and Sculpture (1707). The death of Lebrun placed him at the head of the French school. There are examples of his work in many French museums. Among his mural paintings are those on the ceiling of the Hall of Mars at Versailles, and the "Apotheosis of the Apostles," a fresco at the Invalides. His four paintings at the Louvre—"Jesus and the Pharisee," "The Merchants Driven from the Temple," "The Resurrection of Lazarus," "The Miraculous Draft of Fish"—were reproduced in tapestries by order of Louis XIV and later presented to the Czar Peter the Great on the occasion of his visit to France. His paintings are in the style of Louis XIV, with rather more of the Italian influence showing than in Lebrun.

JOUY, zhōō'ĕ′, Victor Joseph Etienne de (1764–1846). A French author, born at Jouy, near Versailles. In early life he served in the army and afterward took an active part in the troubles of the Revolution. In 1815 he was made a member of the Academy and in 1830 librarian of the Louvre. After 1797 he devoted himself to literature. His works include the opera texts, *La vestale* (1807), music by Spontini, *Les abencérages* (1813), music by Cherubini, and *Guillaume Tell* (1829), music by Rossini; two tragedies, *Tippo Saïb* (1812) and *Sylla* (1822); and his most important writings, several series of sketches, which first appeared in the *Gazette de France*. These were collected under the following titles: *L'Hermite de la Chaussée d'Antin* (1812–14), *Le franc-parleur* (1814), *L'Hermite de la Guyane* (1816), *L'Hermite en province* (1818–27), and, with Antoine Jouy, *Les hermites en prison* (1823) and *Les hermites en liberté* (1824). He was also the editor of several journals. He published an edition of his own *Œuvres complètes* in the years 1823–28.

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